PROCEEDINGS

1987 MANITOBA BEEF CATTLE SEMINAR JANUARY 20 - 21

87-02128/

TABLE OF CONTENTS

	PAGE
A CALF MANAGEMENT PROGRAM TO REDUCE STRESS - Dr Ed Duren, College of Agriculture University of Idaho, Moscow, Idaho	1
NEW APPROACHES FOR SILAGE - Duane McCartney, Ag Canada Research Station, Melfort, Saskatchewan	16
THE ECONOMIC RETURNS AMONG FOREIGN CATTLE BREED CROSSES AND THE VALUE OF BREED TRAITS Elwin G. Smith, Ag Canada Research Station, Brandon, Manitoba	21
HOW WE MANAGE OUR FEEDLOT - K. H. McDonald, Three Bars Ranches Ltd Indian Head, Saskatchewan	34
IDEAS FOR A WORKABLE EFFICIENT GRAZING PROGRAM - Duane McCartney, Ag Canada Research Station, Melfort, Saskatchewan	42
BEEF CATTLE MANAGEMENT BY OBJECTIVE - Ed Duren, University of Idaho	46
FACTORS AFFECTING THE FUTURE VIABILITY OF THE CATTLE INDUSTRY - Maurice Kraut, Livestock Consultant Winnipeg, Manitoba	61
SHAPE UP OR SHIP OUT - Al Hingston, Saskatchewan Agriculture Regina, Saskatchewan	78
DOC, LET'S RUN HER ONE MORE YEAR - Baxter Black, D.V.M. Brighton, Colorado	85

1987 MANITOBA BEEF CATTLE SEMINAR

January 20-21, 1987
Agricultural Extension Centre
Brandon, Manitoba

Those of you who attend the 1987 Beef Cattle Seminar will take home a wealth of information of real value to your cattle operation. Back again is the popular "computer room" plus commercial displays and special guest speaker Baxter Black from Colorado.

MONDAY EVENING, JANUARY 19

7-9 p.m. Registration — Agricultural Extension Centre
Set up Displays

TUESDAY, JANUARY 20

7:30 a.m. Breakfast — Agricultural Extension Centre
Morning Chairman — Lyle McNichol, Beef Specialist Manitoba Agriculture, Dauphin

8:30-10:00 Registration, coffee and visit displays and computer room

10:00 **A Calf Management Program to Reduce Stress**
Dr. Ed Duren, College of Agriculture
University of Idaho, Moscow, Idaho

11:00 **Feed Preservatives**
Dwayne McCartney
Ag Canada, Melfort

12:00 Lunch — Agricultural Extension Centre
Afternoon Chairman — Gunther Rahnefeld
Agriculture Canada, Brandon

1:15 p.m. **Economics Returns Among Foreign Breed Crosses**
Dr. Elwin Smith
Agriculture Canada, Brandon

2:00 **Feedlot Management**
Ken McDonald, Three Bars Ranch
Indian Head, Saskatchewan

3:00 Coffee — visit displays and computer room

3:30 **A Workable, Efficient Grazing Program**
Dwayne McCartney
Agriculture Canada, Saskatchewan

4:15 **Computer Livestock Management Program**
Art Domes, Manitoba Agriculture
Portage La Prairie
Fraser Stewart, Manitoba Agriculture
Beausejour
Evening Chairman — Norm Hemstad, Manitoba Agriculture

6:00 Supper — Agricultural Extension Centre

7:30 p.m. Premier Breeder Awards — Purebred and Commercial

8:00 **Doc, Let's Run Her One More Year**
Baxter Black,
Brighton Colorado

*(**NOTE:** For those **NOT** registered for the seminar, a $5.00 fee will be charged for Tuesday evening's program)*

9:30 Bull Session — Games Room

Baxter Black comes to us courtesy of the Manitoba Beef Cattle Performance Association and the Manitoba Aberdeen Angus Association.

WEDNESDAY, JANUARY 21

Morning Chairman — Don Guilford, Pres. Manitoba Beef Cattle Performance Assoc.

7:30 a.m. Breakfast — Agricultural Extension Centre

8:30-10:30 **Cattle Management by Objectives**
Dr. Ed Duren

10:30 Coffee — visit displays and computer room

11:00 **Livestock Trends**
Dr. Maurice Kraut
Livestock Consultant, Winnipeg

12:00 Lunch — Ag Centre and visit displays
Afternoon Chairman — Bob Richmond, Chief of Beef Section Animal Industry Branch, Manitoba Agric

1:30 p.m. **Testing — 1, 2, 3!**
Premiere of new M.B.C.P.A. film

2:00 **Shape Up or Ship Out**
Al Hingston, Beef Program Manager
Saskatchewan Agriculture, Regina

3:00 Closing Remarks & Adjourn

SEMINAR SPEAKERS

Dr. Ed Duren — University of Idaho's extension livestock specialist, Ed Duren is actively involved in state and national livestock program development.

Dwayne McCartney — Dwayne's recent research into livestock feed preservatives at the Melfort Research Station will be of real interest to cattle producers.

Dr. Elwyn Smith — Elwyn comes from a farm in south central Saskatchewan. His work at Brandon's Ag Canada Research Station is with the foreign cattle breed evaluation project.

Ken McDonald — runs the Three Bars Ranch feedlot near Indian Head, Saskatchewan. He comes to us highly recommended as a practical feedlot manager and a good speakers.

Art Domes and Fraser Stewart — Manitoba Agriculture. Fresh from the success of the '86 Beef Cattle Seminar, Art and Fraser are ready to take your figures and run some budgets for you.

Baxter Black — A legend in his own time, Baxter Black has spoken over 500 times in 38 states and in Canada over the last five years. Author, broadcaster, veterinarian, he has been called "Will Roger's Wierd Grandson".

Dr. Maurice Kraut — CBC radio listeners will know Maurice Kraut's astute weekly comments on the way things are and are likely to be in the livestock business in Manitoba and around the world.

Al Hingston has managed a 300 cow-calf, 800 cow community pasture in Saskatchewan and knows the value of production records.

CALF MANAGEMENT PROGRAM-- TO REDUCE STRESS

Ed Duren
University of Idaho

High death loss among newborn calves is not uncommon on many beef cow-calf operations. Calf survival is critical, particularly at two definite periods--perinatal and weaning.

Typically within the Intermountain West, ranches begin calving in mid-February. It is not uncommon for the calving season to extend beyond 140 days. Frequently, within a herd some cows may calve later on the range after spring turnout in late May or June, and even into late summer. The length of calving easily can become a problem area similar to calf survival.

During the period of early spring calving, the temperature of dry cold may dip well below zero degrees Fahrenheit. In mid-spring, the fluctuating temperature may rise above zero degrees, but stay below 32 degrees Fahrenheit. However, wet storms of snow or rain, combined with the wind and low temperature continues to stress newborn beef calves by severe wind chill.

One can well imagine the fate of a newborn calf that has just been born following a nine-month period of living in a "warm jacuzzi," the uterus of a mother cow. This calf could well have suffered the fate of a prolonged birth--8 to 12 hours--and even the possibility of manual delivery. Nevertheless, being dropped on a cold wet calving ground and left with the responsibility for survival by getting up, finding a teat, and suckling is no small task even for the vigorousness of newborn calves.

This scenario is more common than the extreme. As a result, the less vigorous calves continue to become less thrifty within a short period following birth, usually experiencing scours or other forms of sickness followed by various sundry "sure-cure" medications and eventual death.

Calf survival is one thing if a calf may live or die. But survival of thrifty calves becomes even more important. Producers have seen calves who may survive but are unthrifty and never regain their "do-in" ability to grow. These calves are highly susceptible to disease and readily become sick. This stunting effect often results in a doggie calf that may last a lifetime. The animal may never regain thriftiness before attaining slaughter weight.

If you, as a producer, are in a wreck with calf scours or other disease problems resulting in sickness and death loss, proceed to identify and correct the situation with appropriate

professional assistance. It is unwise to readily apply general treatment recommendations or refuse to alter traditional calf management schemes in an attempt to save these calves. In these situations, the expectations of a miracle cure from a pill or single injection may not be a reality.

Furthermore, as a livestock professional, it behooves you not to issue blanket recommendations to all ranches relative to calf survival. Undoubtedly, a common misconception by the professional is that our recommendations will fit all ranches engaged in cow-calf production.

This is far from the truth. The reason being is simply cause and effect. This is to say the problem will vary from ranch to ranch. How then can one advise a producer on how to improve the rate of calf survival and increase the number of thrifty calves within the herd?

Integrated calf management may well be the approach for your ranch or client. This is a problem-solving concept based upon the integration of both technology and people in a total management system designed to improve the calf crop. The integration of applied technology is the easy part. The integration of people to apply the technology in the management system is usually more difficult.

The work reported here represents the results of clinical laboratory and field investigations for the second of a three-year project entitled "Application of Herd Health Management Practices to Improve Survival of Beef Calves." This project is part of the Idaho Total Beef Program Project (ITBP) entitled "Applied Beef Cow/Calf Management Practices to Improve Production Efficiency - ITBP-SEIVB." The project this past year involved extension faculty in five counties in southeastern Idaho, an extension livestock specialist, University of Idaho based research faculty, the Washington Animal Disease Diagnostic Laboratory (WADDL) located at Pullman, Washington, thirty-four beef cattle ranchers, the Total Beef Program Committees representing each of the five counties involved, veterinary practitioners in the area, and representatives of the agriculture lending agencies.

The integrated working relationships in a problem solving mode by producers, veterinarians, practitioners, agriculture lenders, Cooperative Extension staff, and University scientist have established a network to transfer and adopt new technologies.

Each of the following technologies are being practiced by producers and implemented on the cooperating ranches.

Calving Barn Management

Calving barns, in the past, have had a reputation for being a cause of neonatal calf sickness rather than a solution to the problem. Calving barns are often only as good as they are managed. The purposes of the calving barn are to reduce environmental stress on newborn calves, provide a clean dry place for calving, promote the cows' acceptance of their calves, and improve the rancher's ability to provide care and treatment for the cow and newborn calf.

Calving barns equipped with box stalls, warming rooms, head catches, and hot and cold running water are a necessity for the cowboy to save both calves and cows during a spring calving season with environmental conditions conducive to cold wet stress.

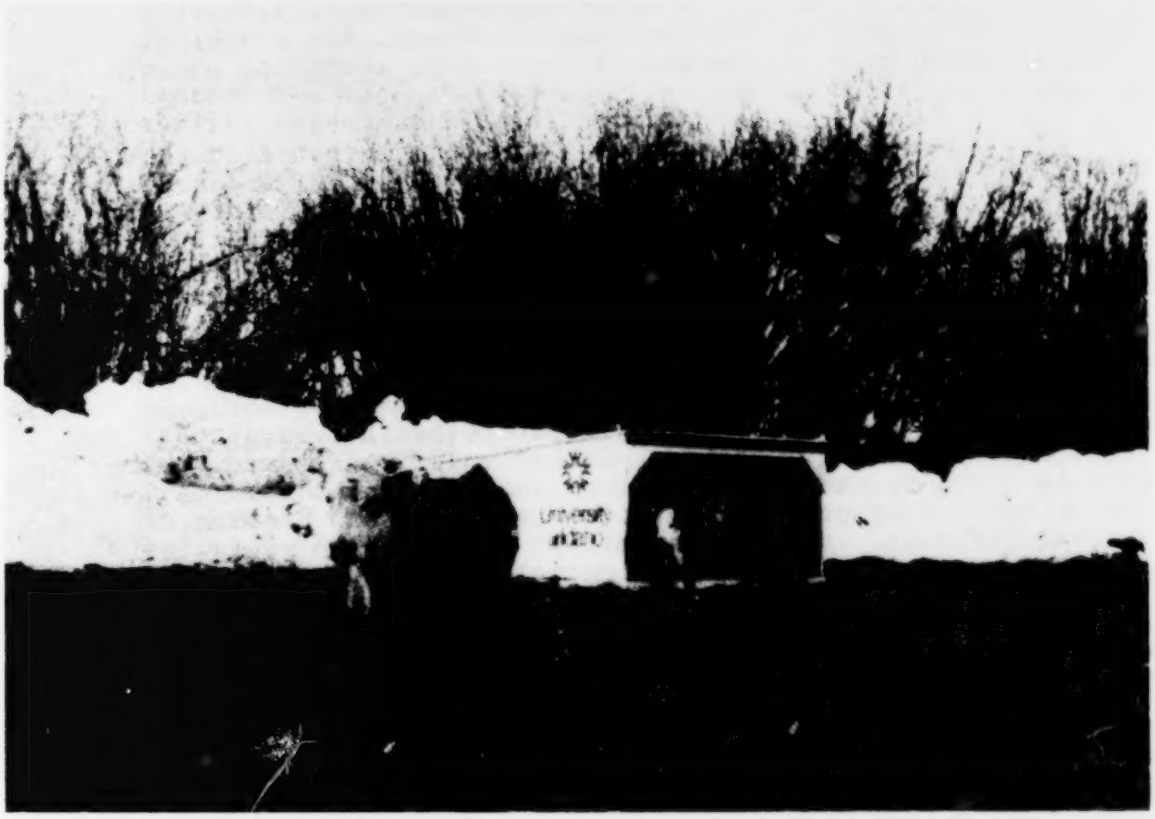
Experiences on the cooperating ranches demonstrated that management practices may vary somewhat, but if the purposes of the calving barn were optimized, barn use was successful. For example, on the Reid Ranch, the barn was managed for optimum cleanliness, while providing protection and care for the newborn calves. The stalls were cleaned, limed, and strawed after each cow calved. Calving equipment was also washed and sanitized. Cows were neither fed nor watered while in the barn and remained in the barn not longer than 12 hours unless complications occurred. Also, sick calves were not returned to the calving barn for care. A separate facility was provided as a hospital pen for sick calves. Similar practices were followed on other cooperating ranches. Calving barns are cost effective in providing protection during the birthing process for cows, calves, and cowboys in the early spring calving season of inclement environment and weather.

Video Monitoring of Calving Barns

Monitoring of near term cows can be a problem depending on the proximity of the calving barn to the house. At the Rusty Davis Ranch in Downey, the calving barn is approximately 200 yards from the house so it is an effort to get out and check the cows at 3:00 a.m., especially if the temperature is -20 degrees Fahrenheit.

Technology is available to put video equipment into the barn and transmit the image to the house. The equipment used includes a video camera, a TV genie transmitter, a UHF TV lens and mounted in the barn at a strategic location. The signal is relayed to the TV genie transmitter which broadcasts it to the antenna on the house. No extra lighting is required for nighttime viewing.

The video system proved to be labor efficient as there were no dry runs to the barn. If a particular cow or heifer



UNIVERSITY OF IDAHO DESIGN CALF SHELTER IN USE ON JR. WHITE RANCH, THATCHER.

was calving, the TV was turned on and other activities pursued until the calf was born or it was determined that the cow needed help. Rusty says, "My wife, Jane, especially likes the system when it is her turn to check the cows."

Calf Shelters

During early spring calving season, calves should have access to protective shelters for at least the first three to four weeks of life. In southeastern Idaho, a newly developed protective portable shelter has proven effective for housing beef calves under range conditions. These open-faced shelters for beef calves are 4 feet (height-front; 3 feet 6 inches-rear) x 8 feet (width) x 8 feet (depth), are constructed of 5/8 inch exterior plywood and framing material, are bedded with straw, and are portable for ease of moving when the bedding becomes soiled. Each shelter can accommodate approximately ten calves and should be positioned so that the open front faces away from the prevailing wind.

Furthermore, portable calf shelters are rapidly finding a role in calf survival on many ranches. Portable calf shelters offer protection from wind and wet, predominantly to reduce the wind chill factor. These shelters may be used in addition with available natural protection; i.e., windbreaks of hills, brush, snow, etc.

Today's economic conditions will not tolerate excessive calf death losses due to neglect. Calf shelter facilities are essential and cost effective to good calving management and calf survival.

Flow Patterns

Management of the movement of cows through the calving process during the season can affect calf survival and labor utilization. The Presto Project on the Reid Ranch near Blackfoot Idaho, demonstrated the benefits of using a flow pattern. Prior to the 1986 calving season, the cow herd was split into three groups of over 100 head each. Each herd was the responsibility of the cowboy assigned to that herd through the calving season. Cows that calved were kept in their respective herds. This resulted in very long hours for all three people tending the herds and difficulty in keeping up with problem cows and/or sick calves.

In the 1986 calving season, the flow pattern all the cows regardless of age, were combined into one herd. Cows nearing parturition were sorted out daily and driven to a drop herd near the calving shed. Upon calving, either in the shed or outside depending on weather or the presence of complications, the pair was moved within 8-12 hours for additional mothering

to a mixing corral containing portable calf sheds. The cow-calf pair remained in the corral for one to two days with other pairs prior to turn-out into a hillside pasture also equipped with portable calf sheds. The cows and calves remained on the hillside for five to seven days and then turned out into another pasture equipped with portable calf sheds and natural windbreaks. After two weeks elapsed, the cattle were moved to other pastures. The cattle were maintained in smaller groups for longer periods for easy access and observation during the critical period. The herd gradually increased in numbers following each mixing movement.

Using this flow pattern resulted in more efficient utilization of ranch labor. Ranch personnel were able to rotate night watch, gain adequate rest, and make a concerted effort in their daily feeding and ranch work. They were able to observe the cow-calf pairs more closely and put other recommended practices to use. For example, calves needing help were suckled sooner, sick calves were spotted and treated promptly, and the calving shed stalls were maintained in a ready condition between cows.

Colostrum

A calf is born without any immunity to disease organisms. It is nature's way to provide this immunity from the suckling of colostrum from the dam. As a result, antibodies produced by the dam via the colostrum provide passive immunity to the calf.

Colostrum is important in providing this protection and other nutritional elements vital to the survival of the calf. However, we may have been guilty in promoting myths associated with colostrum. The old adage that colostrum is colostrum and it is all good is obviously not true. Also, to assume a calf has what it needs is further from the truth.

Furthermore, the quality of colostrum as indicated by immunoglobulin content is more concentrated from beef cows as opposed to dairy cows. University of Arizona research by Stott suggests a wide variation in colostrum for both quality and quantity among dairy cows within a herd and also contrast between dairy and beef cows. Stott also found the higher the quality of colostrum (i.e., the greater concentration of immunoglobulin) the less amount needed to be consumed by the calf to establish passive immunity.

The practice of supplying a range calf dairy colostrum from neighboring dairy herds certainly can be challenged due to the wide variation in quality and rapid deterioration following each subsequent milking. Colostrum has a half life following each milking. Colostrum taken after the second or third milking may not be any better quality than normal milk

in terms of passive immunity. Furthermore, the dairy cow from which the colostrum has been obtained may not have been immunized to the same pathogens as the beef herd. In actuality, the calf may receive little, if any, worthwhile immunity.

Colostrometer Use

The quality of colostrum can vary considerably from cow to cow. Also the concentration of colostrum in the milk begins to drop rapidly after parturition. The colostrometer can be used to check the quality of colostrum. When the quality of the colostrum from a particular cow is known to be inadequate, her calf can be fed high quality colostrum from another cow. Calves receiving no colostrum or poor quality colostrum are highly susceptible to invading disease organisms due to lack of passive immunity. Although somewhat time consuming, checking colostrum and supplementing when necessary may result in a savings of time from reduced sick calf treatment and reduced calf death losses.

Experience on the cooperating ranches has indicated that heifers and old cows may have a higher incidence of low quality colostrum and perhaps should be checked. Also, using the colostrometer to determine the quality of colostrum being stored for supplementation is a worthwhile practice. In addition to calves whose dams produce low quality colostrum, calves experiencing difficult birth may benefit from a supplemental dose of high quality colostrum since such calves experience gut closure to antibodies in colostrum earlier than calves experiencing normal births.

Colostrometers were used on cooperating ranches as a part of the studies being conducted relative to colostrum quality. Ranchers frequently used the colostrometers to check colostrum quality from questionable cows and heifers not included in the study groups, and to check colostrum they intended to save for future use.

Early Suckling

Early colostrum suckling by newborn calves is extremely important to the calves' ability to resist disease when challenged by infection. Research has shown that gut closure to some antibodies in colostrum occurs as early as six to twenty-four hours after birth. Insuring that all newborn calves receive their first milk as early as possible requires a constant vigil, and often assistance is needed by some calves. All calves receiving their first milk one hour after birth is a realistic goal. Calves not suckling on their own by that time may require assistance, or in some cases, they require feeding with an esophogeal tube. Early suckling by

all calves is promoted by regular observations and adequate facilities that make observation and assistance possible.

The benefits of early suckling were inadvertently demonstrated on one of the cooperating ranches when one calf was accidentally overlooked during observations and failed to nurse on its own. It was just over twelve hours old when the problem was discovered and corrected. This calf was the only calf requiring isolation and special care due to illness.

Colostrum Absorption

The calf who frequently sucks small quantities of high quality colostrum within the first twelve hours of life will obtain a higher degree of passive immunity than a calf subjected to cold stress and may have delayed the ingestion of colostrum.

In a range calving operation, the assumption that each and every calf has ingested colostrum under the described conditions is essentially misleading. The failure of a calf to suckle before the gut closes to immunoglobulin absorption, contributes in a failure of the mother cow to transfer passive immunity via colostrum immunoglobulins. Consequently, this calf lacks sufficient immunity for adequate pathogen protection.

The mechanics of colostrum ingestion can be delayed for many reasons and attributed to various causes associated with udder shape, teat size, dystocia, cold stress, weakness, and neglect.

Data obtained so far from an ITBP field demonstration and trial currently in progress in southeastern Idaho have identified several important problem areas that have a direct bearing on the immune status of beef calves. Results show that the age at first nursing was prolonged in some cases up to twelve to eighteen hours of age and the total gammaglobulin levels in colostral whey of some cows and in the serum of many calves were exceedingly low. To avoid these potential problems: 1) Producers should suckle or hand feed calves that have not suckled by one hour of age, 2) A colostrometer should be routinely used to monitor total gammaglobulin content of fresh colostrum at parturition, and 3) The sodium sulphite turbidity test of serum can be used to determine the passive immune status of calves at least once during the first twenty hours of life.

Calf Immunization

Contrary to the belief of many people, calves are born immuno-competent a calf can be vaccinated at an early age (1-3 days) and active immunity successfully established.

The age-old argument of colostrum antibodies becoming immuno-suppressant to the active immune response of the foreign protein in the vaccine is certainly not being verified by current scientific research and field observation. Furthermore, ranches practicing early calfhood vaccination (1-3 days of birth) have demonstrated an increased survival rate among the early vaccinated calves. This success may well be attributed to the variation or lack of colostrum quality and delayed suckling.

Research has established the effectiveness of early calfhood vaccination for IBR and clostridium pathogens. Granted not all pathogens have been verified, but field experience by ranches vaccinating calves at the early age is highly suggestive of its effectiveness.

Unless proven otherwise, early vaccination of newborn calves will be readily adopted as a new technology on many progressive ranches. It certainly is worthy of consideration regardless of what we have been taught in the past relative to immune response by the neonatal calf.

Branding Process

The stress factors reviewed are normal for a range beef calf from birth until branding. There has been no discussion relative to the management of a chilled, weak, unthrifty calf which becomes sick due to scours or other calfhood diseases.

The branding process can create additional stress on calves due to rough crude handling of cows and calves or due to dramatic changes in the environment. However, calves can handle this stress if they are thrifty and have the correct start in life.

Depending upon ranch management, calves may have received their first vaccination at birth or at branding. In addition, all bull calves are branded, castrated, and implanted with Ralgro. Heifer calves not selected as replacements will also be implanted.

The summer envrionment associated with range management, cattle co-mingling, and projected disease challenge will determine the immunization schedule and sequence for appropriate disease organisms. Calves vaccinated at birth may be given a booster vaccination at branding and/or again at ten to fourteen days preweaning. In each successive vaccination,

the immune response becomes faster and more efficient. Some ranches routinely vaccinate calves at birth, branding, and preweaning. This procedure has been deemed cost effective.

Disease Prevention

In order to optimize a herd health program, postmortem examination by a practicing veterinarian with subsequent laboratory analysis of tissues is sound diagnostic procedure to establish disease organisms exposed to a herd. Once disease organisms are identified in a herd; then a sound annual vaccination program within the limits of available and effective vaccines can be established to prevent the occurrence of these diseases for cows and calves.

People Integration

Ranch owners and/or managers with an interest to integrated management will begin to assemble a ranch team--that is the cowboys responsible for calving the cows and handling the herd throughout the grazing season and until the weaning process is complete. The success of this team is highly dependent upon their level of understanding; i.e., educational training and interaction with a professional team; namely, the veterinarian and animal scientist serving the ranch.

When harmony, understanding, and cooperation exist among members of these two teams, only then can you anticipate to solve the problems associated with calf death loss and increase the survival rate of thrifty healthy calves.

In today's world there are an unlimited number of drugs, vaccines, growth stimulants, feed additives, etc., all claiming fame to thrifty calves and profits. How does a producer begin to select the given combination for their ranch? It is not uncommon for a rancher to give up in despair trying to seek this profitable combination. A team of experienced professionals can be valuable to this ranch operation and successfully select the appropriate products to a profitable advantage of the ranch.

Summary

From birth to weaning, calf stress may be typical in many herds. Calf stress can be categorized in four distinct areas for ease in isolation and identification of the key causes, both natural and man-made. These categories will include:

1. Environment
2. Disease

3. Nutrition
4. Management

Unfortunately, the cause of the problem may not limit itself to only one category, but overlap in other areas. However, there is usually a primary key cause which can be identified that will prioritize the key management changes in a systems approach.

A live thrifty calf is obtained with herd management by objective. Therefore, an increased rate of calf survival and growth can be attributed to the integration of key management changes within the herd. An intergrated calf management system will include a total management approach in the areas of:

1. Breeding Soundness
2. Calving Management
3. Sick Calf Treatment
4. Herd Immunization
5. Cow and Calf Nutrition
6. Calving Facilities
7. Calf Shelters
8. Growth Management
9. Herd Records
10. Cowboy Skills

The Idaho Total Beef Program emphasizes this problem-solving concept with an integrated educational thrust to improving reproductive efficiency of which calf survival is a vital segment. The "Idaho Cow-Calf Management Guide and Cattleman's Library" is a vital tool to herd management by objective. Do you have a copy?

Protective Shelters

For Beef Calves on Range

David P. Olson and Louis E. Riesenberg

Beef calves are often born under range conditions and during winter when it is highly likely that they will be exposed to cold temperatures, strong winds and excessive moisture. Often, little opportunity exists to provide either manmade or natural shelter for these animals.

Early field and laboratory studies have shown a direct relationship between environmental stress of young calves and incidence of digestive and respiratory diseases; however, little information was known then about the effects on metabolism and organ functions of the animals. More recently, several studies were conducted at the University of Idaho to determine in part the specific changes seen in cold-exposed calves.

Results showed that exposure of young calves to severe cold temperature causes depression, physical weakness, reluctance or inability to nurse, difficulty in maintenance of normal body temperature and eventual coma and death because of respiratory failure. Significant changes were also observed in concentrations of several blood constituents and white blood cells that normally aid the animals in resistance to disease. Also, a delay in onset and a significant decrease in the rate of absorption of colostral immunoglobulins occurred in these animals.

The conclusion made from the results of these studies was that beef producers must somehow provide a means to prevent exposure of their young calves to these environmental stressors. This task is made more difficult, however, because beef calves usually commingle with their dams on range and are normally not kept under confinement.

Shelter Idea Comes From Dairy Industry

The idea for providing temporary and protective shelter for beef calves on range was borrowed from a common calf management practice used by dairymen where single calves are reared in shelters called "calf hutches." Researchers at the University of Idaho modified the plans for these "calf hutches" and developed a shelter that could be used by young beef calves raised under range conditions. With the help of Extension county agents and selected beef producers, a trial was begun in Idaho during the 1984 winter calving season to field test the practicality and effectiveness of the newly developed shelters.

Two shelters, each equipped with weather monitoring equipment, were placed on each of four ranches located in different regions of the state. The cattlemen recorded weather data and number of calves within the shelters twice a day. The data obtained so far are limited although they point to the success of the shelters as a means for rearing young beef calves.

Certain management practices must be followed to assure that the shelters meet their intended purpose. **The shelters are designed to accommodate up to but not more than 10 calves at a time. Calves, especially those from first-calf heifers, should have access to the shelters for the first 3 weeks of life.** The front opening of the shelter is large enough to allow calves to enter and leave at will but is too small for heifers and cows. Further, this restriction in the number of calves per shelter will allow 6½ square

feet of floor space per animal and will prevent the potentially serious problem of overcrowding.

Shelters must be bedded with clean, dry straw; avoid use of wood shavings for bedding material. One 65- to 75-pound straw bale is usually sufficient to bed a single shelter. The shelter must be moved to an adjacent location and rebedded whenever the old bedding material becomes wet and soiled.

Remember that proper sanitation by use of clean, dry bedding at all times is absolutely essential for successful use of the shelters. The old bedding material should be burned or discarded by some other means after use. Shelters should be placed in parallel rows on ground with good drainage and as close as possible to where the cows are fed and where they normally calve.

Placement of the shelters near the feeding and calving grounds reduces to a minimum the distance between where the calves normally nurse and where they seek shelter. **In addition, the open front of the shelters should face south or in a direction opposite from the source of prevailing winds and storms.** Shelters should be raised off the ground on blocks in a convenient storage area during off seasons.

Construction Plans and Materials List

Following is a detailed description of the procedures for construction of the shelters and a bill of materials. Prices for building materials vary; however, the total cost for construction, excluding labor, is about $125.00 per shelter.

The calf shelter here can easily be constructed with five (5) sheets of 4 × 8 foot exterior plywood and nine (9) 8-foot 2×4s and two (2) 8-foot 2×6s for framing (Fig. 1.). The finished unit is 8 feet wide and 8 feet deep and has a front height of 4 feet that slopes to a rear height of 3½ feet to allow for drainage of rain and melted snow.

The design is such that the sides can be assembled on the ground. **Note that the 2×4 supports on the sides, front and back are located on the outside of the plywood.**

No inside floor exists and a tractor with a front-end loader can move the unit short distances by use of the ½-inch eye bolts mounted on the upper corners. Alternately, skids made of 4-inch diameter wood poles may be installed on the sides and used for relocation of the shelters. Skids may also be made of 4×4 inch posts, although

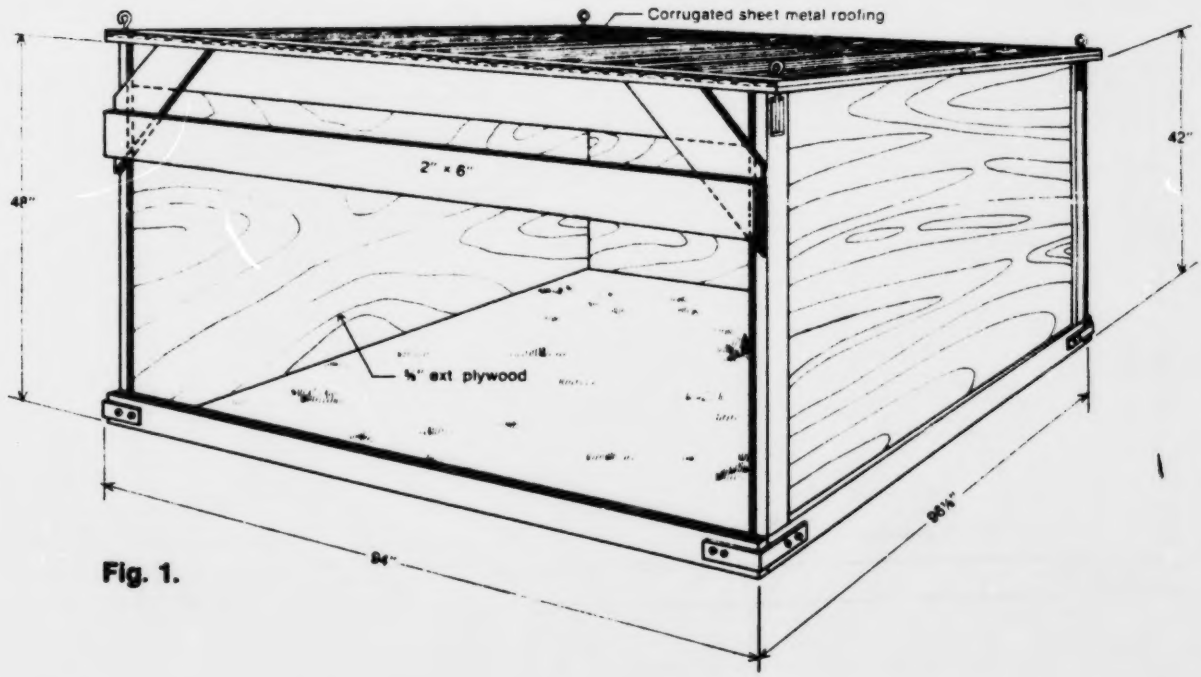


Fig. 1.

the bottom edges should be rounded to minimize the surface area that may freeze to the ground. The inside and outside surfaces of the bottom 6 inches of the unit are treated with a wood preservative, and a good quality latex or oil-base exterior paint should be applied to all weather-exposed surfaces.

Side Panel Construction

On Fig. 2, note the dimensions of the side plywood panels (92½-inch(L); 48-inch(H) in front; 42-inch(H) in rear). The 2×4s are nailed to the plywood on the outside with 8d galvanized nails, and the nails are clinched. The joist hangers are positioned midway between front and rear and directly beneath the junction of the front and rear roof panels and fastened to the plywood sides with ¼ × 1¼-inch carriage bolts.

Unit Assembly

The rear plywood panel is cut to a width of 94 inches and a height of 42 inches and nailed to the 2×4 support member with 8d galvanized nails. The assembled panel is then nailed to the rear edges of the side panels with 8d galvanized nails.

The lengths of the 2×4 and 2×6 framing members for the front of the shelter are 94 inches and 89¾ inches, respectively. The 2×6 is positioned on top between the side panels and temporarily fastened with 16d galvanized nails. The 2×4 is positioned at the bottom and across the front edge and is also temporarily attached with 16d galvanized nails. The ⅛ × 2-inch metal straps should then be bolted onto the corners with ⅜ × 2-inch and ⅜ × 3-inch carriage bolts.

The 2×4 joist, cut to a length of 89¾ inches, should now be placed into the joist hangers and fastened with 8d galvanized nails. An optional 2×4 joist, placed from front to rear and midway between the sides, may be used to provide added stability to the roof panels. Next, make 2 × 2-inch plates from 2×4 material and nail to the inside upper edges of the side and rear plywood panels with 8d galvanized nails. The 2 × 2-inch plates along the side plywood panels will have to be cut to length to accommodate the 2×4 joist. Make certain the front of the shelter is plumb, and then nail the front gusset braces (6½ inches wide, cut to 45 degree angles and made from the waste of the rear plywood panel) in place. Cut the front 2×6 plate to length (94 inches), and nail over the gusset braces so as to leave a 30-inch clearance space from top to bottom (see Fig. 3).

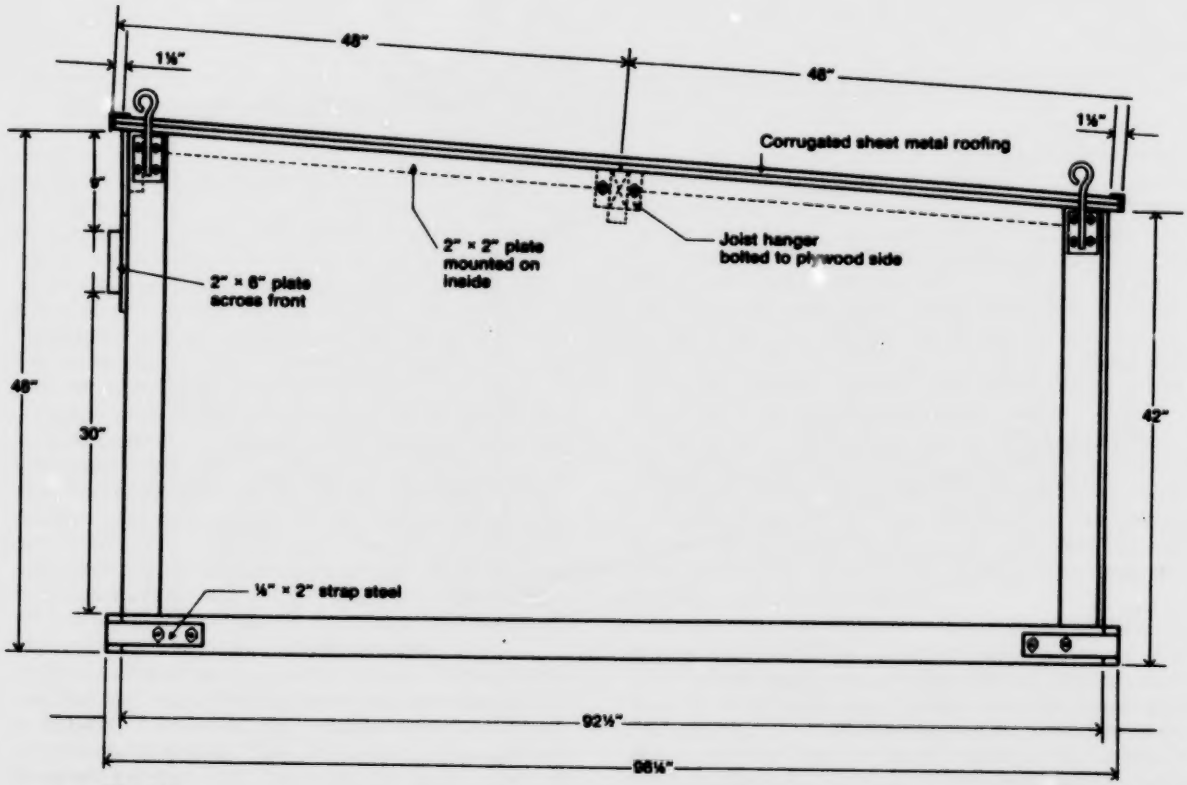


Fig. 2.

Be certain the shelter is square (about 133 inches between opposite corners), then attach the plywood roof panels to the 2×2-inch plates and the 2×4 joist with 8d galvanized nails. Next attach the corrugated metal roofing to the plywood roof panels with roofing nails. Cover the front and rear ends of the roofing with metal flashing, and trim or turn in all sharp corners.

Finally, the ⅜-inch eye bolts are welded to ⅛ × 3 × 3-inch plates and attached to the front corners by ⅜ × 3-inch carriage bolts and by ⅜ × 4-inch lag screws fastened through to the 2×6 framing member on top as illustrated. The eye bolts attached to the rear corners are fastened by ⅜ × 3-inch carriage bolts. See Table 1 for a complete materials list.

The Authors

David P. Olson is a professor of veterinary science in the University of Idaho Department of Veterinary Science, Moscow. Louis E. Riesenberg is an assistant professor of agricultural education and an agricultural engineer in the UI Department of Agricultural Engineering, Moscow.

Table 1. Bill of material.

No.		Description
5	-	⅜"×4'×8' C-D exterior plywood
9	-	2"×4"×8'
2	-	2"×6"×8'
4	-	lb 8d galvanized nails
1	-	lb 16d galvanized nails
1	-	lb galvanized roofing nails
14	-	⅜"×3" carriage bolts and washers
4	-	⅜"×2" carriage bolts and washers
4	-	¼"×1¼" carriage bolts and washers
4	-	½"×6" eye bolts
2	-	⅜"×4" lag screws and washers
2	-	2"×4" joist hangers
4	-	⅛"×2"×15" steel strap
4	-	sheets 26"(W)×8'(L) corrugated steel roofing, 31 gauge
2	-	8' metal flashing strips, angled and 1"×2" on a side
1	-	qt wood preservative
1	-	gal exterior latex or oil-base paint

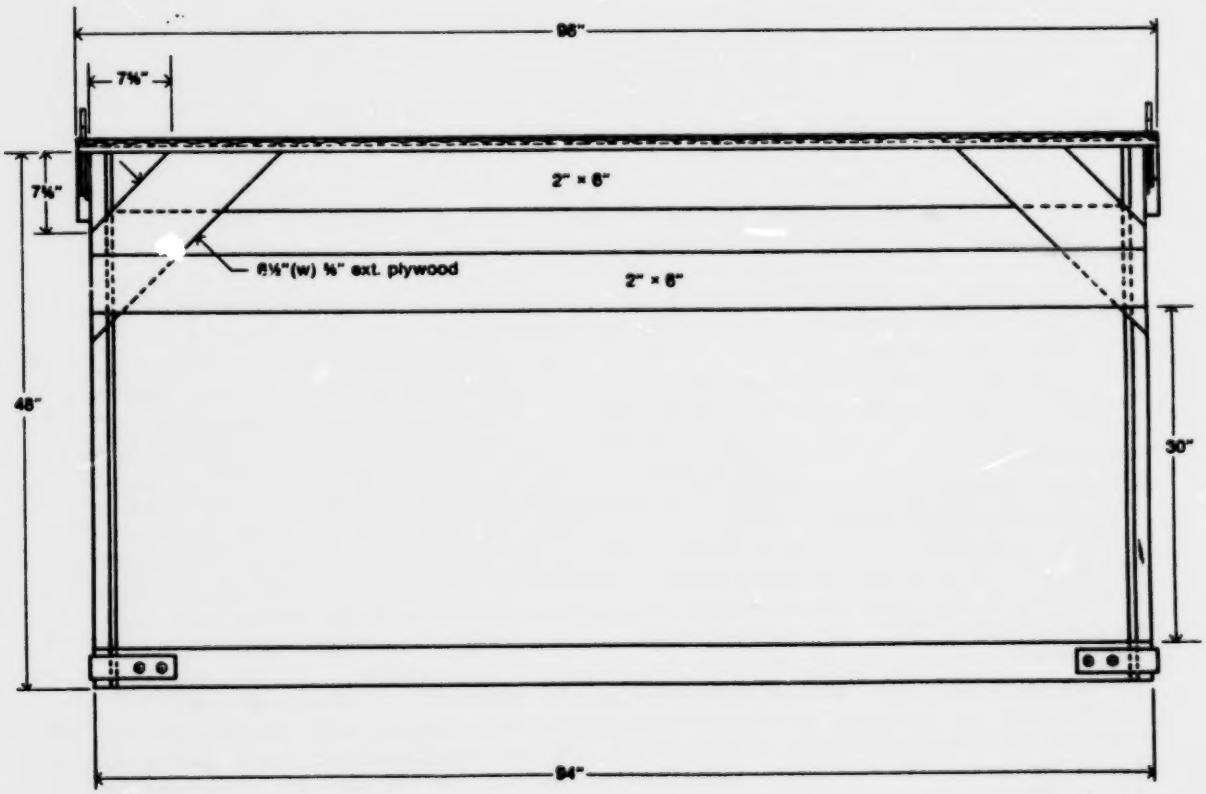


Fig. 3.

NEW APPROACHES FOR SILAGE

Duane McCartney & Zahir Mir
Agriculture Canada Research Station
Melfort, Saskatchewan

The process of ensiling as a means of feed preservation has been around for a very long time. However, new approaches in silage production are aimed at decreasing the possibility of harvest, storage and feeding losses, and making the process cost effective. The wide range of results in producing silage show the need for more reliable methods of ensuring consistent quality. Although silage additives do help improve the quality of silage it is important to know when they would be beneficial or when they are an unneeded expense. At present, data from scientifically controlled studies on silage additives is scarce and conflicting, and caution should be used when considering the alternatives. One must remember that we never recover more nutrients from silage than we harvest and place into storage. The goal of improving silage system efficiency is to maximize the recovery of harvestable nutrients consumed by the animal.

Type of Fermentation

The general idea of silage fermentation can be simply stated. The carbohydrates in the original plant material are converted by micro-organisms into organic acids with a resulting drop in pH. When the pH or acid level is sufficient to inhibit further fermentation, the mass becomes stable and the silage is preserved.

Phase 1, the respiration phase begins as soon as the plant material is placed in the silo. Green plants, when chopped and placed in the silo, bunker or pit, continue to live and breathe for a short period of time. The plant cells continue to take in oxygen as many cell walls are still intact. At the same time aerobic bacteria (oxygen-loving) which are present in large numbers on the stems and leaves of the plant begin to grow. The oxygen is contained within and between the forage particles at the time of ensiling. It is important to understand that Phase 1 is an undesirable phase. Aerobic bacteria consumes soluable carbohydrates such as sugars and starches and produce heat, water and carbon dioxide. Too much oxygen in the forage mass increases the use of carbohydrates, favors the growth of molds and yeasts, causes considerable breakdown of plant protein into non-protein nitrogen and the generation of excess heat. If the heat exceeds 35°C or 95°F, it can reduce digestibility of the protein and carbohydrate portions of the forage, resulting in a heat-damaged silage. Because this phase occurs only in the presence of oxygen, the primary objective at ensiling time is to eliminate as much oxygen from the ensiled mass as possible. There are several management procedures which help to eliminate the oxygen. If the ensiled forage contains less than 45% moisture, the material will not pack as tightly in the silo as wetter material, and more oxygen will be trapped between the feed particles. The ideal moisture content for tower and bunker silos is about 65%, while oxygen-free silos require an average moisture of 45 to 50% to prevent excessive heat damage. Mild heat damaged silage is

sometimes mistaken for excellent material because of its sweet aroma and excellent palatability to livestock. In fact, this silage has undergone a mild form of heat damage known as "carmelization". The digestibility of the protein is reduced and in some cases this damage can be excessive. Heating of silage can occur in sealed units as easily as in conventional stave, poured concrete or bunker silos if the material is placed in the unit when it is too dry and contains excessive oxygen. Crude protein analysis of forages will not detect heat damaged material. Digestible protein calculated from an acid detergent fiber bound nitrogen analysis will indicate if the silage has undergone heat damage.

Excessive moisture levels above 70% can cause seepage loss and an undesirable fermentation in the later phases which produces a sour silage and reduces the dry matter intake by the cows. High moisture silage stored in tower silos should have a moisture content of 65% in the lower half of the silo and 70% or less in the upper half in order to minimize seepage loss. Seepage loss will be minimal in bunker or pit silos with moisture levels of 70%.

The time needed to fill a silo can affect the quality of the product. Excessive exposure to oxygen because of delayed wilting, slow filling or delayed covering can easily increase forage loss due to extended aerobic fermentation.

Phase 2, the acetic acid production of the fermentation process begins after all the oxygen in the ensiled forage has been used by the oxygen requiring bacteria. At this stage bacteria that grows without oxygen (anerobic bacteria) begins to grow and multiply. These bacteria ferment soluble carboyhdrates and produce acetic acid. This is the desirable "pickling" process. The production of acetic acid is also beneficial to the ruminant as they can utilize the acetic acid. The bacteria acidify the forage mass and lower the pH from about 6.0 in green forage to a pH of about 5.0 which causes the acetic acid bacteria to decline in numbers. This phase of the fermentation process continues for one to two days.

The third or lactic acid production phase starts with the increased acidity of the forage mass. The lower pH enhances the growth and development of another anerobic group of bacteria called lactobacilli and streptococci bacteria. The sooner the silage enters the lactic phase of fermentation the lower will be the energy losses and the higher the nutrient content of the silage.

The fourth phase is a continuation of the third phase. Lactic acid bacteria continues to increase in numbers, to ferment soluble carbohydrates and gives off lactic acid. This phase will continue for a period of about 2 weeks or until the pH or acidity of the silage is low enough (4.0-4.5) to restrict the growth of all bacteria. At this point, if air is kept out, no further fermentation should occur.

The various phases of the normal fermentation process tend to overlap one another due to the variety of fermentation bacteria present and their tolerance to the presence of oxygen and different acidity levels.

If acidity is not high enough an undersirable stage of fermentation occurs. Instead of lactic acid producing bacteria developing, large populations of clostridia bacteria may grow in the silage. These anerobic bacteria convert the remaining soluble carbohydrates and lactic acid to butyric acid. This is an undesirable phase of fermentation and results in the production of ammonia from protein and losses of energy in the form of carbon dioxide and heat. The palatability of these silages are greatly reduced and are commonly referred to as "sour or rancid silages". This phase of silage fermentation will not occur when proper silage production practices are followed and provided there is an adequate supply of readily available carbohydrates in the forages. Forage crops wetter than 70% moisture tend to favor the growth and development of the undesirable fermentation bacteria. Thus low carbohydrate levels and forage that is too wet causes the production of butyric acid.

As silages are removed for feed, another process may occur if the silage is too dry or has a relatively low acid content. Molds and yeasts begin to grow resulting in heat production, a reduction in digestibility and a decrease in palatability sometimes as the result of toxins.

In summary, the fermentation process is a rapid production of acid dependent on an anerobic environment in the silo. This is influenced by the moisture and soluble carbohydrate content and the buffering capacity of the forage. If the forage is harvested at the proper moisture content, chopped fine, packed thoroughly and covered as fast as possible to exclude outside air as normal silage fermentation should result.

Silage Additives

Various substances have been added to silage at ensiling time for over 100 years. The theory behind most of these additives is to alter the fermentation process in order to produce a more desirable feed. These materials can be divided into four main categories: preservatives, direct acidification additives, added feedstuffs and fermentation aids. Many of these types of additives have some beneficial effect but few are reliable additives producing consistently good results.

Preservatives

Antibiotics could theoretically improve forage preservation through specific antibacterial action. Desirable bacteria could function more efficiently and improve silage fermentation if detrimental bacteria and bacterial groups could be inhibited. Antibiotics such as zinc bacitracin have shown improvement in color, aroma and crude protein preservation in a few studies but most other studies have shown inconsistent results.

Sterilants are used to prevent deterioration and fermentation by killing or inhibiting all micro-organisms. It is extremely difficult to get complete sterilization, thus most products slow down or inhibit undesirable fermentation. Sodium chloride, sulfur dioxide, sodium metabisulfate, sodium benzoate and sodium nitrate have been some of the sterilants that have been

evaluated. Problems of irritation to workers, reduced palatability, high costs, and variable results add to the problems of their limited success. Formaldehyde limits fermentation in the first hours of ensiling because of the bacteriadal actions. It inhibits the growth of aerobic bacteria which reduces the loss of soluble carbohydrates and inhibits growth of butyric acid-producing bacteria. Economics and non-clearance is the major drawback on its use.

Direct Acidification

Adding acid to forage at ensiling replaces or enhances the acid normally produced during fermentation. If sufficient quantities of acid are added, the pH of the material is reduced to the point where all bacterial fermentation is inhibited. When lesser amounts are added, lactic producing organisms that are more tolerant of acidic conditions begin to produce lactic acid sooner thus reducing total fermentation time and fermentation losses.

Formic acid at 2% on a dry matter basis or 3-4 kg per wet tonne of silage has been successful in reducing pH and preventing secondary fermentation in high-moisture grass silage. Higher rates are required for legume silage. The material is very corrosive and proper safety precautions must be used. Studies in Europe and North America have indicated that the addition of formic acid to unwilted silage (82-74%) moisture has improved the nutrient quality of the silage through an increase in digestibility intake and utilization. Formaldehyde has been used in combination with formic acid in order to protect the protein fraction of the forage from being degraded into non-protein nitrogen.

Propionic acid-based liquid preservatives have some times proven effective in reducing nutrient losses but can also be unpleasant to work with. Other commercial products containing different combinations of propionic, acetic, lactic, citric, fumaric and formic acids are available but improved animal performance is inconclusive. The major draw back of using acids is the large quantities of acid that must be applied and the corrosive nature of the substance.

Powdered Additives

Powdered additives are another form of altering the fermentation process. Most are lactic acid bacteria cultures that increase the availability of carbohydrates and other nutrients to lactic acid producing micro-organisms. The commercial additives can be classified into three categories: sodium metabisulfite salts, enzymes, and dried cultures of lactic acid bacteria. The sodium metabisulfite salts react with water in high-moisture grass to produce acid and lower the pH. There is some indication that the sodium metabisulfite salts are effective in reducing surface spoilage and improving the palatability of high moisture silage. Enzymes are compounds that will initiate particular chemical reactions. Some enzyme additives are supposed to stimulate fermentation and lactic acid production by breaking carbohydrates into sugars that are utilized by bacteria to produce the acid. The enzymes should be added in sufficient

quantities and must be evenly mixed in the forages. Some research has found that enzymes are sensitive to heat and other conditions present in the silo. The effectiveness of adding enzymes is variable.

Bacterial inoculants are supposed to control the fermentation process by adding sufficient quantities of lactic acid bacteria to the forage. To be effective, these bacteria must be specific strain of lactic acid producing bacteria to survive the first stage of fermentation. There are differences in the types and strength of bacterial silage additives with a few being effective under certain conditions. The effectiveness is variable and the animal response is often no better than the response to untreated silages.

Added Feedstuffs

Some grass and alfalfa forages which are low in soluable carbohydrates are more difficult to ensile because anerobic bacteria require the soluble carbohydrates to produce acetic and lactic acids. In some areas, molasses, sugar, cereal grain and whey a by-products of the cheese making industry have been added to increase the soluble carbohydrates to insure a proper fermentation process. Although this method is usually effective the availability and cost of the material prevent their use.

Ammonia and urea act both as a sterilant and a feed additive. The available ammonia reduces and kills the growth of molds, yeasts and bacteria depending upon the concentration of ammonia. This would prevent fermentation and deterioration within the ensiled mass. Urea and anhydrous ammonia are effective in increasing the nitrogen content of silage. This can be used to replace part of the required protein supplement for ruminants.

If silage management is properly done, using additives offers little benefit. However, the use of additives might be considered when it is difficult to meet all the requirements of producing top quality silage.

THE ECONOMIC RETURNS AMONG FOREIGN CATTLE BREED CROSSES AND THE VALUE OF BREED TRAITS

Elwin G. Smith
Agricultural Economist
Agriculture Canada Research Station
Brandon, Manitoba

INTRODUCTION

A cow-calf producer has the objective of maximizing profits from the production of calves. This objective requires producing the highest value of saleable product (calves) at the least cost for a given herd size. To accomplish this, the producer must have a herd with the genetic potential to produce a high level of output at the lowest cost as well as good managerial ability. Genetic traits that will have an economic impact on feeder calf production can be divided into those that are output related: calf size, cow reproductive performance, and the finishing ability of the calf; and others that are input related: feed requirements, calving difficulty, and cow longevity. This paper examines the profits from specific breed crosses with different traits and estimates a value of the traits.

Traits and Their Role in Profits

The weaning weight of the calf is comprised of two parts, the birth weight and the gain prior to weaning. The birth weight makes up only 20 percent of the weaning weight, therefore, the gain component is likely to be economically more important than the birth weight. The reproductive performance of the herd determines the number of calves produced. The reproductive performance is affected by the conception rate, the calving rate (defined in this paper as the number of live births per pregnancy), and calf death loss from live birth to weaning. The finishing ability of the calf will influence the price feedlot operators are willing to pay for calves. The unit price received by the cow-calf operator will be higher for calves that are profitable in the finishing phase. The greater these three output factors - weaning weight, reproductive performance and calf price - the greater will be the level of profits from a cow-calf enterprise.

Winter feed requirements are higher for larger cows, increasing the cost of maintaining larger breeds. Difficult calvings increase veterinary costs and labour requirements. An increase in calving difficulties is often associated with higher birth weights. The longevity of a cow will effect profits in three ways. There is a cash cost to purchase replacements, net of any salvage value for the cull. Replacements will wean a smaller calf, and the replacements will require feed for growing in addition to maintenance. The higher the feed requirements, calving difficulties, and replacement rate are, the lower will be the level of profits.

No breed, or breed cross, excels in all the output and input traits described. Therefore, when producers are selecting a breed, a breed cross, or replacements within a breed, beneficial traits must be weighed off against the negative traits. The dilemma facing producers is to know the traits of the different breeds and breed crosses, and to know the value of these traits in production. Which breed has a high value of output? Which breed has the lowest production costs? How much weaning weight can be sacrificed for lower calving

difficulties? How much must the reproductive performance increase to compensate for higher winter feed costs? These are a few of the decisions facing producers when selecting a breed, a breed cross, or replacements within a breed.

TRAITS OF SELECTED FOREIGN CATTLE BREEDS

The introduction of foreign breeds of cattle into Canada was a source of new germ plasm and crossing with the British breeds resulted in greater productivity due to hybrid vigor. A production advantage to including these foreign cattle breed crosses in herds has been documented. These breeds and breed crosses produced larger calves, but little was known about the reproductive performance of the breeds and breed crosses, the higher feed and calving costs, or the longevity of the cows. The benefits of increased calf size could be negated by poorer reproductive performance and higher costs.

To evaluate the performance of different foreign cattle breed crosses in western Canada, Agriculture Canada initiated the foreign cattle breed evaluation (FCBE) research project in 1969. A semi-intensive operation, characteristic of the Parkland region, which includes Manitoba, was evaluated at Brandon. The reproductive performance and the winter feed energy requirements of the first-cross cows as well as the progeny performance from the first-cross cows and terminal sires were evaluated.

FCBE Project Breeds

The FCBE project centered on specific three-breed crossing systems using defined first-cross cows and specific terminal sires. Charolais (C), Simmental (S), Limousin (L), and Chianina (Chi) terminal sires were bred to nine foreign F1 crosses produced by mating C, S, and L sires to Hereford (H), Angus (A), and Shorthorn (N) dams. A tenth F1 cross, Hereford-Angus (HA), was used as a control. The matings were designed to produce three-breed cross calves, therefore, none of the females were backcrossed. There were a total of 31 three-breed cross calves produced from the matings and these are shown in Table 1 as the F1 crosses mated to each terminal sire breed. There were 572 first-cross dams at the start of the project. There were 2006 calves born and 1930 calves weaned during the project. There were 2994 cow years for the feed data.

Table 1. Breed crosses in the FCBE research project

Terminal sire	First-cross cows
C+	HA SH SA SN LH LA LN
S	HA CH CA CN LH LA LN
L	HA CH CA CN SH SA SN
Chi	HA CH CA CN SH SA SN LH LA LN

+ C=Charolais, S=Simmental, L=Limousin, Chi=Chianina, H=Hereford, A=Angus, and N= Shorthorn

FCBE Output and Input Traits, Breed Cross of Cow Specific

There were three traits independent of the terminal sire breed. These were the winter feed maintenance of the cow herd, the conception rate, and the cow replacement rate. Table 2 contains data from the FCBE project at Brandon on these three traits. Winter maintenance feed requirements were lowest for the lighter weight F1 crosses. The HA was the lightest weight and required the least amount of winter feed (Table 2). The L cross cows were the next heaviest and required more feed than the HA. The C cross cows were the heaviest cows and required the greatest amount of feed per day during the winter feeding period. The conception rate was higher for the C cross and the A cross cows. The replacement index indicates the rate of culling among the F1 crosses. This index was calculated from FCBE culling, setting the HA equal to 100. The CH crosses were culled at 88.1 percent of the HA rate of culling, the SN at 120.3 percent of the HA. To illustrate, suppose 20 percent of a HA herd was replaced each year, then 17.6 percent (20 X .881) of a CH herd and 24 percent (20 X 1.203) of a SN herd would be replaced each year.

Table 2. Output and input traits for the FCBE project, breed cross of cow specific data

Breed cross of cow+	Cow weight, weaning (lb)	Feed for winter (Mcal/d)	Conception rate (%)	Replacement index
HA	1102	20.09	83.1	100.0
CH	1303	23.68	82.4	88.1
CA	1248	22.66	89.6	75.3
CN	1305	23.39	85.3	83.3
SH	1208	22.21	82.2	137.0
SA	1193	22.22	84.0	124.7
SN	1199	21.88	84.8	120.3
LH	1195	21.59	78.8	138.3
LA	1151	21.14	83.8	106.2
LN	1177	21.70	80.8	203.5

+ Breeds as defined in Table 1

FCBE Output and Input Traits, Three-breed Cross Calf Specific

The data in Table 3 were dependent on the breed cross of cow and the terminal sire. The birth weight of calves, male and female from heifers and cows; the calving rate of cows and heifers; the average daily gain of calves prior to weaning, male and female from cows and heifers; calving assists, which include difficult pulls and caesareans; calf death losses prior to weaning from those live at birth; and the price premium (or discount) paid for foreign breed crosses over a British breed cross were all traits that affected the returns by

Table 3. Output and input traits for the FCBE project, three-breed cross calf specific data

Three-breed cross+	Male birth wt.		Fem./male birth weight	Calving rate		ADG*				Calving assists		Calf death loss	Price premium	
						Cows		Heifers						
	Cows (lb)	Heifers (lb)	---- (proportion)----	Cows	Heifers	Males (lb/d)	Females (lb/d)	Males (lb/d)	Females (lb/d)	Easy (%)	Difficult (%)		Males -- ($/100lb) --	Females
CHA	90.8	76.5	.950	.944	.954	2.01	1.83	1.61	1.50	11.8	3.4	.022	4.80	9.00
CSH	105.6	79.1	.903	.969	.983	2.23	2.09	1.79	1.76	9.7	8.1	.079	4.80	9.00
CSA	98.1	79.1	.965	.940	1.000	2.25	2.23	1.79	1.72	3.8	8.5	.052	4.80	9.00
CSN	103.4	79.4	.898	.979	.958	2.25	2.16	1.83	1.76	17.4	8.5	.032	4.80	9.00
CLH	101.8	76.3	.872	.988	.933	2.05	1.94	1.72	1.61	1.4	9.7	.049	4.80	9.00
CLA	91.7	73.0	.928	.971	.947	2.07	1.92	1.61	1.59	3.6	1.7	.017	4.80	9.00
CLN	105.4	80.0	.877	.953	.909	1.96	1.96	1.81	1.65	3.7	20.2	.063	4.80	9.00
SHA	92.1	76.5	.941	1.000	.954	1.96	1.90	1.61	1.50	11.4	3.2	.019	2.00	3.00
SCH	103.6	81.1	.909	.938	.947	2.07	1.98	1.54	1.59	6.7	7.5	.024	2.00	3.00
SCA	98.8	73.9	.881	.992	1.000	2.14	1.96	1.54	1.59	7.2	6.7	.056	2.00	3.00
SCN	105.4	85.8	.931	.991	1.000	2.20	1.94	1.85	1.74	14.9	2.3	.091	2.00	3.00
SLH	94.4	76.3	.949	.969	.933	2.09	1.83	1.72	1.61	2.6	4.7	.014	2.00	3.00
SLA	87.5	73.0	.986	.972	.947	2.14	1.87	1.61	1.59	0.0	7.6	.022	2.00	3.00
SLN	94.8	80.0	.958	.983	.909	2.03	2.03	1.81	1.65	8.5	7.5	.000	2.00	3.00
LHA	86.9	76.5	.909	1.000	.954	1.90	1.76	1.61	1.50	4.7	3.1	.031	4.50	9.00
LCH	92.1	81.1	.936	.946	.947	1.94	1.85	1.54	1.59	4.7	5.4	.000	4.50	9.00
LCA	93.5	73.9	.898	1.000	1.000	2.05	1.85	1.54	1.59	12.5	1.2	.036	4.50	9.00
LCN	96.3	85.8	.954	.965	1.000	1.98	2.03	1.85	1.74	4.9	2.1	.000	4.50	9.00
LSH	94.4	79.1	.924	1.000	.983	2.05	2.05	1.79	1.76	11.5	1.9	.010	4.50	9.00
LSA	87.5	79.1	.851	.960	1.000	2.05	2.05	1.79	1.72	4.9	0.6	.031	4.50	9.00
LSN	94.8	79.4	.947	.988	.958	2.12	2.01	1.83	1.76	4.2	3.5	.000	4.50	9.00
ChiHA	95.5	76.5	.870	.959	.954	1.94	1.96	1.61	1.50	6.9	6.5	.031	2.00	3.00
ChiCH	109.1	81.1	.860	.992	.947	2.12	1.90	1.54	1.59	14.3	4.4	.027	2.00	3.00
ChiCA	102.3	73.9	.913	.991	1.000	2.16	2.05	1.54	1.59	13.9	6.3	.038	2.00	3.00
ChiCN	109.8	85.8	.911	.988	1.000	2.23	2.01	1.85	1.74	7.8	12.2	.028	2.00	3.00
ChiSH	106.7	79.1	.895	.977	.983	2.27	2.12	1.79	1.76	13.4	8.8	.033	2.00	3.00
ChiSA	99.2	79.1	.977	.965	1.000	2.29	2.09	1.79	1.72	8.2	11.2	.035	2.00	3.00
ChiSN	103.8	79.4	.970	.982	.958	2.23	2.16	1.83	1.76	11.9	8.2	.018	2.00	3.00
ChiLH	102.1	76.3	.942	.979	.933	2.12	1.87	1.72	1.61	17.5	4.9	.000	2.00	3.00
ChiLA	100.7	73.0	.880	.983	.947	2.16	1.63	1.61	1.59	0.0	7.6	.056	2.00	3.00
ChiLN	101.4	80.0	.917	.972	.909	2.05	2.07	1.81	1.65	5.0	7.3	.090	2.00	3.00

+ Breeds as defined in Table 1

* Average daily gain from birth to weaning

three-breed cross of calf. Calf birth weights were highest for the Chi and C terminal sire cross calves. The C cross cows had the highest birth weights. The calving rate was generally highest for the L terminal sire and the C cross cows. Calf weight gains were highest for the Chi and C terminal sires and the S cross cows. The S cross cows had the highest calf weaning weight, even though they did not have the highest birth weight. Calving difficulty was highest for the Chi and C terminal sires and the L and S cross cows. Calving difficulty was highly variable by three-breed cross of calf. Calf death losses were generally highest for the Chi and C terminal sires and the L cross cows. As with calving difficulty, death loss was also variable by three-breed cross of calf. There was a price premium for all foreign cattle breed crosses used in this study over straight British breed crosses, indicating superior feedlot and finishing qualities over the straight British breed crosses. Charolais received the highest premium and L was slightly less. The S crosses had the lowest premium. No data were available for Chi, so the premium was set equal to S because of the similarities in finishing ability between these two breeds.

ECONOMIC CONSIDERATIONS

In evaluating the returns by breed cross, the gross returns and the gross expenses must be considered. The highest net return will not be the breed with the highest gross returns, nor the breed with the lowest costs. The high return is often negated by higher expenses, and the lowest cost breed cross may also have low gross returns. The net of receipts and expenses is what is important from an economic standpoint. Net farm income (NFI) is the preferred measure of farm profits and equals receipts less expenses plus adjustments in the value of inventory.

An economic analysis was done to estimate the NFI from the three-breed cross calves in the FCBE project. Net farm income was calculated for each of the 31 three-breed cross of calves. A farm similar to the average Manitoba farm reported in the 1981 Census of Agriculture was used in the analysis. The farm had cow-calf and grain enterprises. The grain portion of the farm was incorporated in the analysis to make it more realistic, because the majority of cow-calf producers in Manitoba have a mixed-farm operation. The breeding herd had 25 cows, including the first-calf heifers. Management of the herd followed that of the FCBE project. Breeding of the cows and heifers was by artificial insemination. The breeding season lasted nine weeks, commencing in mid-June, and no clean-up bulls were used. Heifers were bred to a smaller calving breed, Red Angus or Beefmaster, to reduce calving difficulties. Calving commenced in late March and ran about nine weeks. All cows were pregnancy tested in the fall. Some of the FCBE management practices were modified to reflect practices used in the Parkland. Cows were pastured for six months, including grazing of crop stubble, and wintered on hay. Cullings were based on the longevity of the F1 crosses in the FCBE project. Replacements were purchased as calves in the fall, at a premium to feeder calves, and grown out on the farm.

The marginal value of a trait indicates how much NFI will change with a one unit change in the trait. The value is useful in evaluating which traits have the greatest economic importance and the economic effects of trade-offs between traits. The marginal values are obtained by estimating an equation in which NFI is a function of unit calf price, birth weight, average daily gain of the calf, conception rate, calving rate, calf death loss, cow replacement rate, calving

difficulty, and winter maintenance feed energy requirements.

RESULTS

Net Farm Income Rankings

The net farm income by three-breed cross of calf was ranked from highest to lowest. The differences in NFI per cow from the breed cross with the highest NFI, the CSN, are illustrated in Figure 1. The actual NFI was not reported because actual NFI will vary by herd and farm size. The per cow difference was reported because the differences will apply across different herd and farm sizes. The three-breed cross definition along the side of the figure has the terminal sire breed followed by the breed of the first-cross cow. The breed cross CSN, for example, is a C terminal sire and a SN cow. The horizontal axis shows how much lower NFI was for each three-breed cross compared to the CSN, which is zero in the figure. The small bars, such as those for the LCA and ChiCA, indicate that NFI was not much lower for these crosses than for the CSN. The long bars, such as those for CLN, ChiHA, etc., indicate that NFI per cow for these breed crosses was substantially less than for the CSN. The lowest NFI per cow was for the L cross, HA, and CH cows.

Additional analyses were done to determine the impact of the feeder calf price changes and the size of farm on the NFI rankings. There were some changes, but not enough to report the individual NFI differences and rankings. When calf prices were lower because of poor market conditions, the breed crosses that had lower production costs moved up in the ranking. The LCA, CLA, and CHA were crosses that moved up slightly in the rankings because of lower production costs. A situation of higher calf prices will favour the breed crosses that produce more weaned calf, even if costs are relatively high. The Chi terminal sire moved up in the ranking and the L terminal sire went down in the ranking when market prices were high. The larger farm size did have a minor effect on the rankings. The LCA breed cross had the highest NFI, $2.70 per cow higher than that of the CSN. This is $7 per cow higher than the NFI of the CSN for the smaller farm size. There were some other subtle changes to the rankings, but the overall ranking did not change. The rankings were fairly stable across farm size and calf prices. The SN and CA cows and the L terminal sire were high in the rankings. The L cross, HA, CH, and SH cows, and S and Chi terminal sires were low in the rankings.

The NFI results by F1 cow cross were further brought out by expressing the NFI differences from the HA control. Figure 2 shows the differences in NFI per cow from the HA control. There were eight breed crosses that had NFI per cow lower than that of the HA. These included the SCH, LCH, and the LH and LN cows. Across the cows, the CA and SN returned the highest NFI, with the SA and CN being in third and fourth place. The LA cows and the CSH and SCN breed crosses were only marginally better than the HA. This figure confirmed the importance of the breed cross of cow in determining NFI. Net farm income varied as high as $120 per cow depending on the breed cross of cow. The differences were greater than $50 per cow for over half of the three-breed crosses.

Figure 3 gives an indication of the relative performance of the terminal sires by reporting NFI differences from the Chi terminal sire. The Chi was selected because it was bred to all 10 F1 cow crosses. The Chi terminal sire had the highest NFI for the CH cows and higher income than the S terminal sire for C sired cows. The best terminal sire depended on the F1 cow cross. The C terminal sire was best for a LA cow, but a S terminal sire was best for a LN cow. The Chi

Figure 1. Net farm income differences by three–breed cross calf

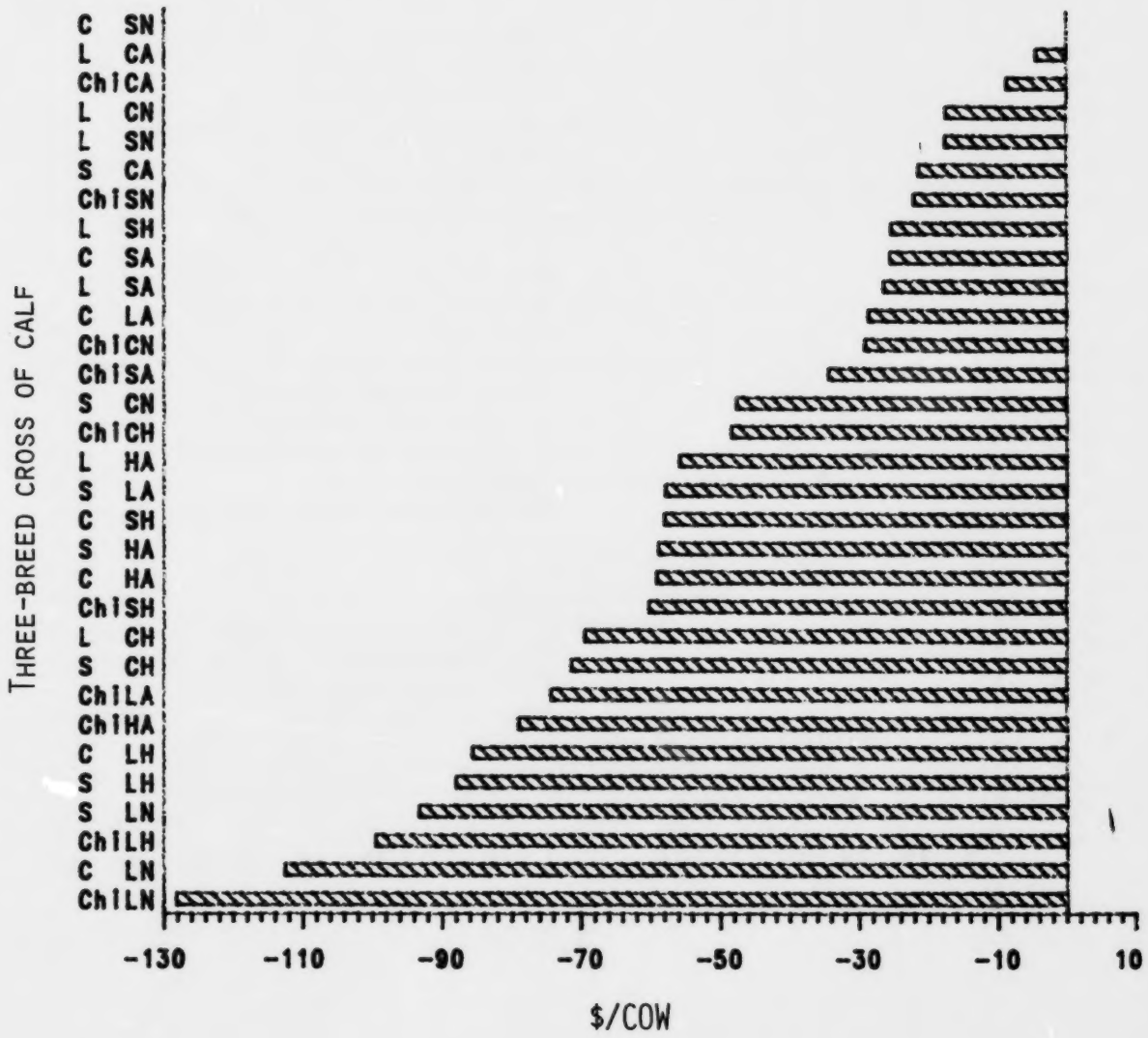


Figure 2. Net farm income differences from the Hereford–Angus

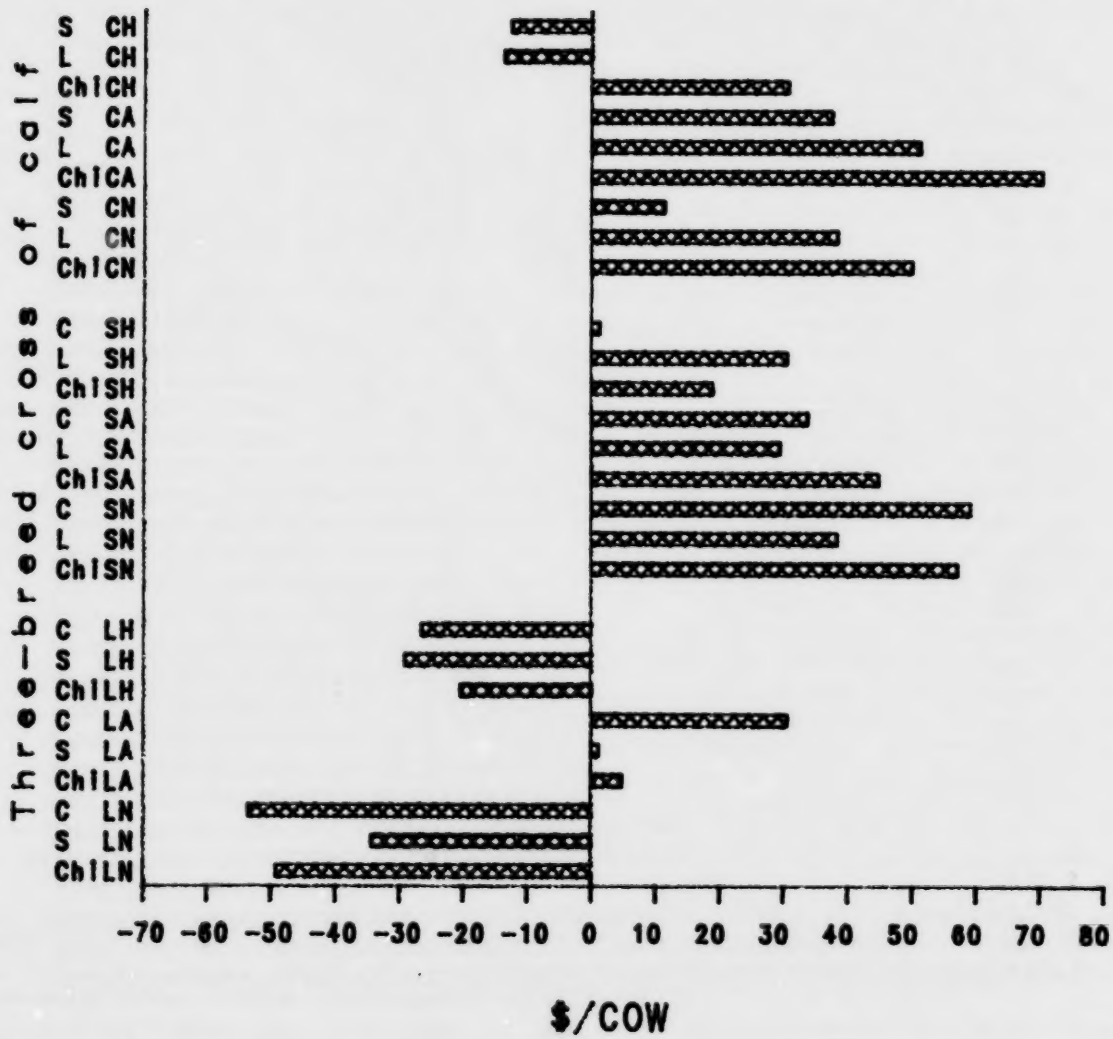
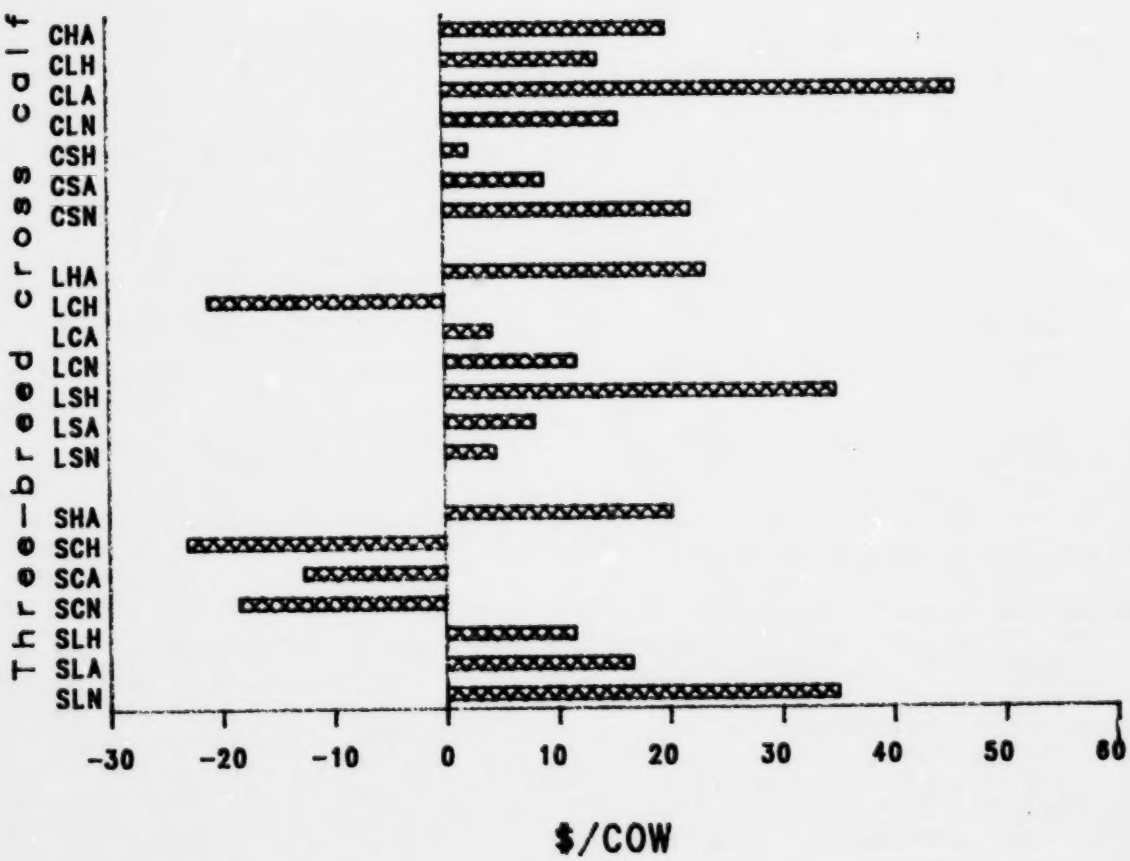


Figure 3. Net farm income differences from the Chianina sire



terminal sire was best for the CH cow, but the L terminal sire was best for the CA cow. Net farm income did vary as high as $45 per cow depending on the terminal sire, but was less than $20 per cow for the majority of the three-breed crosses. Terminal sire breed rankings for each F1 cow cross were included in Table 4. The table reflects what is in Figure 3. The C, S, and L terminal sires were equal for the HA cow, and all were better than the Chi terminal sire. For a CA cow, the L and Chi were equal and better than the S. For the LN, S was better than C, which was better than Chi. Similar comparisons could be made for the remaining first-cross cows.

Table 4. Ranking of terminal sires and breed of sire of cow

First-cross cow+	Terminal sire ranking
HA	L=S=C>Chi
CH	Chi>L=S
CA	L=Chi>S
CN	L>Chi>S
SH	L>C=Chi
SA	C=L>Chi
SN	C>L=Chi
LH	C>S>Chi
LA	C>S>Chi
LN	S>C>Chi
Breed of dam of first-cross cow	**Breed of sire of first-cross cow**
H	S>C>L
A	C>S=L
N	S>C>L

+ Breeds as defined in Table 1

Results Tied to the Input Data

The NFI rankings were tied back to the input data in Tables 2 and 3. Average performance across the terminal sires for four F1 cow crosses were used (Table 5). The cows used were CA, SN, HA, and LN. The trait data were for birth weight, weaning weight, conception rate, calving rate, calf death loss, calves weaned per cow, calving difficulty, winter feed maintenance requirements, and cow replacement rate. The CA and SN cows had the highest net farm income, LN was the lowest, and HA was near the lower end of the rankings. The SN compared with the CA produced a heavier calf and required less feed, but less calves were produced and cow replacement was higher. The HA produced a smaller calf than either the CA or SN, and reproductive performance was lower than the CA and slightly less than the SN. Feed costs were less for the HA. The LN produced a calf of similar weight to the CA, but because of the low reproductive performance fewer calves were produced. The high calving difficulty and replacement rate also reduced the NFI from this

breed cross. Higher weaning weight and lower feed requirements of the SN compensated for the lower reproductive performance and higher culling rate when compared to the CA. Conversely, the higher reproductive performance of the CA compensated for the lower weaning weight per calf. The lower feed requirement for the HA cows did not compensate for the lower weaning weights and reproductive performance. While the LN cows had weaning weights comparable to the CA, the the HA which produced a much lighter calf at weaning.

Table 5. Specific breed cross of cow data

Breed cross cow+	Birth wt. (lb)	Weaning wt. (lb)	Conc. rate (%)	Calving rate (%)	Death loss (%)	Calves per cow (%)	Calving diff. (%)	Winter feed (Mcal/d)	Replacement rate (index)
CA	93.3	500.6	89.6	99.4	4.3	85.2	4.7	22.66	88
SN	97.7	527.5	84.8	96.5	1.7	80.4	6.7	21.88	120
HA	88.4	444.9	83.1	97.1	2.7	78.5	4.9	20.09	100
LN	96.3	499.3	80.8	91.7	5.1	70.3	11.7	21.70	204

+ Breeds as defined in Table 1

The Value of the Traits

To determine the effect of the traits on net farm income, an equation was estimated to predict NFI as a function of the traits. The estimated values were interpreted as how much NFI would change with a one unit change in the trait value. The estimates were reported on a per cow basis in Table 6. An increase in the price of steers of $1/cwt. would increase NFI by $5.84 per cow. Birth weight was found to have no effect of NFI. A .1 lb/d increase in the daily gain of a calf (20 lb over 200 days) would increase NFI by $23.15 per cow. The conception and calving rate estimates were $4.95 and $5.03 respectively, and represented the returns per cow from having one percent more live births. An increase in calf death loss by one percent would reduce NFI by $3.92 per cow. Increasing calving difficulty by one percent would reduce NFI $1.42 per cow. One additional Mcal of feed energy per day more would reduce NFI by $6.74 per cow. (Grass or grass-legume hay contains approximately 1 Mcal of digestible enery per pound). Finally, an increase of one percent in the cow replacement rate would reduce NFI by $1.96 per cow. While these estimates were obtained from a specific breed herd (FCBE), they should apply to most cow-calf enterprises.

Table 6. Marginal values per cow of beef cattle traits

Trait	Marginal value ($/cow)
Steer price (100 lb)	5.84
Birth weight (lb)	-
Average daily gain (.1lb/d)	23.15
Conception rate (%)	4.95
Calving rate (%)	5.03
Calf death loss (%)	-3.92
Calving difficulty (%)	-1.42
Cow feed (Mcal/d)	-6.74
Cow replacement rate (%)	-1.96

DISCUSSION AND CONCLUSIONS

Foreign breed crosses can supply both desirable and undesirable production characteristics. The foreign breed crosses used in this study all produced heavier calves at weaning than the HA control. The higher weaning weight advantage was cancelled out for the LH, LN, and CH cows because of low reproductive performance and higher production costs. The six remaining first-cross cows evaluated in this study were more profitable than the HA control. For these six, the higher production costs, including winter feed requirements, were more than recovered by the higher weaning weights and calves per cow. To reiterate, the size of calves at weaning was not the only important consideration, the number of calves and the costs to get calves to weaning were also important.

Of the breeds in this study, the breed cross of cow was more important in determining the profitablility of three-breed cross calf production than the terminal sire. Within any breed cross of cow, NFI varied at most by $45 per cow across the different terminal sires. Across breed cross of cows, NFI varied as high as $120 per cow with the same terminal sire. This would suggest that the selection of the proper breed cross of cow, or breed of cow, was economically more important than the selection of the terminal sire. Part of this result was because the four terminal sires were all larger, growthier breeds and variation among them would be less. The terminal sire breed, while not as important as the breed cross of cow, did have an effect on NFI.

Birth weight did not have a significant effect on NFI. The growth of the calf from birth to weaning is a better indication of profitability than the birth weight. It should be recognized that high birth weights are associated with high gains, and low birth weights with low gains. Despite this correlation, a high birth weight will not guarantee a high rate of gain.

The estimates of the marginal value for conception and calving rate, and for calf death loss traits were similar in size and could be combined into one variable to reflect the reproductive performance of the breed cross (calves weaned per cow). A four percent increase in the calf crop (1 calf in the 25 cow herd) would increase NFI $16-20 per cow, whether it was due to higher conception rates, higher calving rates, or fewer calf deaths.

The estimated marginal values of the traits can be used as an aid to evaluate

the trade-offs among the traits when selecting a breed or breed cross. Selecting for higher gain may result in higher calving difficulty, so would it be profitable to select for higher gain at the cost of higher calving difficulty? Each percent increase in calving difficulty costs 0.01 lb/d (2 lb/200 day weaning weight) in gain. Therefore, as long as gain exceeds 0.01 lb/d for each percent increase in calving difficulty, it would be profitable to select the higher gaining animal even though calving difficulty would be higher. If higher gain was obtained by using larger cows and the only costs of the larger cows were the winter feed maintenance costs, then to be profitable the calf must gain at least 0.03 lb/d (6 lb/200 day weaning weight) for each Mcal/d of extra feed. For example, looking only at winter feed requirements, the CA calves would have to gain 0.08 lb/day (16 lb/200 day weaning) more than the HA to cover the higher feed costs. The CA gained more than 0.08 lb/day over the HA. Similar comparisons could be made between any of the traits.

There was no one breed, breed cross of cow, or terminal sire breed that exceled in all production traits. As a result, a producer must balance the good with the bad to come out with a combination that would be profitable. Increased calving difficulty, calf deaths, cow winter feed requirements, and cow replacement would all reduce NFI. These costs must be weighed off against the NFI increasing effects of higher gain prior to weaning, conception and calving rates, and desirable feedlot traits as reflected though the price for calves. The results of this study indicated that in the Parkland region of western Canada first-cross SN and CA cows will be the most profitable of the first-crosses used here. The L and C terminal sires were the more profitable terminal sires.

HOW WE MANAGE OUR FEEDLOT

K.H. McDonald
Three Bars Ranches Ltd.
Indian Head, Saskatchewan

Background

Three Bars Ranches Ltd. is a family run farming and feedlot corporation. There are 2400 acres which are used for grain and forage production while some 1500 acres is used for grazing. We usually have about 1500 head in the feedlot at any one time. 600 yearlings are grassed each year. We have a cow-calf operation as well. 40% to 60% of the feedlot cattle are custom fed.

Facilities

Our feedlot is based on the Harvestore system. We have two 25′ x 90′ silos and a 20′ x 80′ silo for high moisture barley. The main feedlot is fed from a belt feeder. The outside pens are fed from a feed wagon.

There is a concrete pad next to the feed bunks. The remaining area of each pen is a clay base. There is a 4% grade for drainage to the outside ditch. All the run off is contained in a pond. Porosity wind

fence surrounds the whole lot. There is also a section of wind fence in each pen which is used as a centre for bedding in the winter. There are no sheds . There are dirt mounds in each pen as well.

The sorting pens, scale, loading chute and sick pen are all in one area which is resonably sheltered so winter work is at least bearable. The crowding alley and chute are inside the main shed.

Feeds and Feeding

Our whole operation is based on silage and high moisture barley. Fall rye, sweet clover and barley are our main forage crops. These crops seem to give enough flexability with respect to crop rotation, seeding and harvesting times. We are able to spread the risk around with these crops because of the differences in growing seasons and maturity dates, etc. We grow all our own forage but are unable to grow enough grain. We have recently started growing and feeding some HY320. It not only spreads the risk aspect again but also is a good feed. We have learned that in order to successful in the feedlot business you must learn be a good grain buyer.

We use feed tests to help formuaite our rations. Feed tests are important because in this business you can't afford to over-feed and you certainly can't afford to under-feed. In our area feed testing by itself is not sufficient. We have found that water testing is also important. We have a fairly high sulfate level in our water so have

adjusted our mineral mix accordingly with increased amounts of zinc, copper and manganese. Trace minerals play a critical role in cattle feeding and cannot be overlooked.

Our premix contains the minerals, vitamins and rumensin that are required. Organic iodide is fed as an aid in foot rot prevention. MGA is used for heifer feeding. It should be noted that our premix is fed at one pound per head per day. We have tried to feed more concentrated mixes at lower rates per day but had inconsistent mixing results.

We do not use antibiotics in the feed or water on an ongoing basis.

New cattle are fed long hay. It is important to make sure these stressed cattle are filled up after they arrive. Get them eating as soon as possible. Calves are started on a 30% barley ration while older cattle are started on a 20% ration. The barley portion is usually increased at the rate of 10% every 3 or 4 days, depending on how much the cattle are eating. The majority of the steers are finished on a 70% ration while the heifers are finished on a 60 % ration. This can vary somewhat depending on the age of the cattle and the frame size.

We feed the cattle twice per day. Generally speaking the more often you feed the cattle the better feed conversion you can get. The saw-off between cost and conversion will depend on each individual situation.

bunk management is critical in the feedlot business. If the bunks are empty for any reason for just a very few hours after the cattle over again. Empty bunks lead to digestive troubles; some of which are easily visible and some which are not.

Health

The most important factor in maintaining a good health record in the feedlot is bringing cattle in that have had as little stress and diease exposure as possible. It doesn't matter what kind of vaccination program is used, if the cattle are preconditioned or where they come from; if the cattle have been subjected to stressful situations, you are going to get more health problems.

Our incoming program for new cattle is as follows:

IBR - PI3 - Somnigen

7-way clostridial

vit. ADE

Ivomec

Ralgro

Pens are checked at least twice a day. Sick cattle are pulled, treated, tagged and are put in a sick pen. We use a treatment sheet to keep track of each individual animal and its treatment record. This serves three purposes.

First, animals which have been previously treated can be easily identified and second, it simplifies the job of invoicing at the end of the month and thirdly, it is especially important to have some kind of recored where there is more than one individual involved in treating the cattle.

Early detection of sick cattle in the feedlot means early treatment which in turn means early recovery. This ability to detect sick animals can come only with practice but it is something which you must get good at. The next most important thing to learn is to give interveinous injections. IV's mean higher blood levels for the antibiotic much sooner.

Proper disease diagnosis is critical. A good thermometer and a stethescope are essential. We consult with our vets about our disease problems and their treatments. It is their job to keep us up to date with respect to new drugs and treatment methods. Our vets spend more time with our dead cattle than the live ones. Post-mortems are extremely important to us because you can monitor exactly what is going on in the feedlot. No guess work is involved.

Cattle

We all have our idea of what the ideal feeder animal is, but there are some generalities that I think are important. The health of the animal is number one. It doesn't matter what the animal cost, if it

dies it doesn't gain very well. We don't really have any breed preference in our feeders. There are good ones in all breeds. What we really like to see is some feeders that have lots of depth and lots of bone. These two factors usually go together. Good feeders must have the gut capacity to hold large quantities of feed. Fined boned, narrow cattle cannot do this as well.

Your cattle buyer can make or break you. Finding a good and an honest buyer may be difficult: however a good one can pay big dividends.

The biggest cost of feeding cattle is the original purchase price. It is extemely easy to buy yourself into a loss situation. We have found it more profitable not to buy the expensive "good" cattle.

We weigh all the cattle on our own scale before they go into the lot. It has been very interesting to see the differences in shrink in the cattle between various buyers and various auction barns. Shrink should not underestimated in its importance. Cattle that are not shrunk properly can be a very costly venture.

We sell most of our cattle on the rail. We haven't got much control over the price we receive but this is one area where honesty can really pay. Do not misrepresent your cattle when selling time comes. Packers do not appreciate it and packers have long memories.

Anyone who is involved in the cattle business has to be made aware of the cyclical nature of the markets. Learn to use this cycle to your

benifit. It is just one more market tool to use.

We don't have much control over the quality of the custom cattle that come to our feedlot. Our regular customers have learned that good cattle means good performance. We cannot do a good job feeding if we haven't got a good product to start with.

Management Tools

If we have learned nothing else since we started our feedlot, we have learned how important scales are. Our operation depends on the number of pounds of beef we produce from the pounds of feed we put out. A legal scale is imperative. The whole operation revolves around this piece of equipment. Do not try and feed cattle without one!

We are using a tendering system more in our operation. This method can be used for almost any feedlot operation such as manure removal, drug or feed purchasing. It can save a lot of money. We always make sure there is a written contract in any of these business arrangements. In times like this when any one of us can be in financial hot water, written contracts and credit checks only make good business sense.

We try to keep our feedlot and the cattle looking as clean and neat as possible. First impressions are important. We want our customers to know that their cattle are getting the best possible care, so we want

everything neat and the cattle comfortable.

Visitors and tours are always encouraged to come to the feedlot. With more pressure from animal rights groups lurking just around the corner, the public perception of feedlots is important. A resonable approach starting right on your own farm and feedlot is a step in the right direction.

Finally, I think it is of the utmost importance to get out to meetings such as this. The small improvements we can make to our operations all add up and in the end, it is producers like you who will be the survivors. The innovators of today set the industry standards of tomorrow.

IDEAS FOR A WORKABLE EFFICIENT GRAZING PROGRAM

Duane McCartney
Agriculture Canada Research Station
Melfort, Saskatchewan

The Melfort Research Station has been involved with a large scale beef cow-calf and pasture management study since 1974. A project jointly sponsored by the Saskatchewan Horned Cattle Trust Fund, Lands Branch of Saskatchewan Agriculture, and Agriculture Canada, was set up to evaluate the economics of time of calving, winter diet, mature cow size and different methods of renovating depleted roughland pastures in the Aspen Parkbelt. This paper will consider the pasture aspect of this project.

A section and a half of marginal gray wooded soil was selected at the Pathlow Community Pasture 25 miles southwest of Melfort. Most of the land was cleared, broken and seeded to bromegrass, alfalfa, red fescue, and alsike clover in the mid 1960's. No fertilizer had been applied. By 1974, which was the year this project was initiated, the carrying capacity of the pasture had declined significantly.

The primary objective of this experiment was to evaluate two methods of rejuvenating established pastures; (i) fertilization alone plus rotational grazing (involving a 4-field rotational grazing system), (ii) rebreaking, reseeding, fertilization plus rotational grazing (involving a 6-field rotational grazing system), and to compare them in terms of forage dry matter yield, and animal productivity to non-fertilized continuously grazed control pastures.

With the rebreaking, reseeding and fertilizing method (ii), two of the six paddocks in this treatment were reseeded to Russian wild ryegrass in the spring of 1976 to permit an extension of the grazing season. Since that time, two of the remaining paddocks in each treatment were broken and reseeded to bromegrass and alfalfa, one in the spring of 1979 and one in 1981. During the summer of 1983, another paddock was worked down, fertilized and reseeded to crested wheatgrass. In 1985 the one paddock remaining in the 6-field system was sprayed with Roundup herbicide and sod seeded to meadow bromegrass and alfalfa.

The fertility program for both these treatments consists of fertilizing half of the paddocks in each treatment on alternate years with 90 kg/ha N, 45 kg/ha P_2O_5, 9 kg/ha S. This system was selected so as to maintain a relatively uniform level of forage production from year to year compared to fertilizing the entire area every other year. Fertilized fields were grazed twice during the grazing season, while little regrowth was available on the nonfertilized rotationally grazed paddocks.

Approximately 300 cows, half Angus x Hereford and half Simmental x Hereford, and their Charolais-sired calves graze the project. Cattle were turned onto either Russian wildrye or crested wheatgrass fields in late May or when the grass is 13-15 cm high. Grazing commenced on the fertilized 4-field system a week later and on the control field the second week in

June. Forage dry matter yields are determined by using cages to prevent representative areas from being grazed. Cattle were weighed when moved from one paddock to the next were rotated around the pasture 1 1/2 - 2 cycles during the grazing season. Calves were castrated in early September and were weaned and removed from the pasture in late September or early October. Cows remained on grass until the forage was depleted which was usually mid to late October.

Since 1974, non-fertilized control fields have produced on average 1143 kg dry matter/ha. Pastures fertilized in the fall or spring just prior to a grazing season produced 2982 kg (a 2.6 fold increase) while fields fertilized the year previous produced 1660 kg/ha. A residual fertility effect has been observed when comparing the increased productivity in 1985 relative to that observed in 1976. In 1976, fields fertilized the previous fall had 2x the forage dry matter productivity increase compared to the non-fertilized areas while the same fields had a 3.1x increase in 1985. Soil tests have been used to monitor fertility changes over the years, but are only showing a slight increase in soil fertility.

The use of fertilizer alone also increased gains and grazing days per hectare. From 1977-84 the fertilized and rotationally grazed treatment produced 43.6 kg/ha of cow gain and 88.0 kg/ha of calf gain while the continuously grazed control fields produced 24.5 kg/ha of cow gain and 57.9 kg/ha of calf gain/ha. The use of fertilizer therefore has produced an additional 19.9 and 30.1 kg extra cow and calf gain, respectively, per ha. Assuming a market value for calves of $1.76/kg, this extra gain would be worth $53.00 per ha. The average annual fertilizer cost was $40.42 per ha per year plus application costs. In other words, the value of the increased calf production was greater than the cost of the fertilizer.

Other benefits due to the use of fertilizer were also observed. Length of grazing season from 1976-1985 increased from an average of 116.7 days for the non-fertilized control paddocks to an average of 129 days for the rotationally grazed fertilized pastures. The control pastures averaged 1.8 ha/cow per season compared to 1.16 ha/cow for the fertilized rotationally grazed treatments.

The reseeding and fertilizing plus rotational grazing treatment also increased forage dry matter production lengthened the grazing season.

Excellent stands of brome-alfalfa have been established following rebreaking and reseeding. Those stands that were reseeded and fertilized in 1979 and fertilized in late fall or early spring of 1981, 1983 and 1985 produced 4023.5 kg/ha of dry matter in 1985; those fertilized and reseeded in 1981 and fertilized in late fall or early spring of 1983 and 1985 produced 3567.3 kg/ha, while the non-fertilized, non-reseeded control areas produced 1121 kg/ha during the 1985 growing season. Crested wheatgrass fertilized and seeded in 1983 and 1985 produced 3912 kg DM/ha in 1985. In comparison, the original swards that were fertilized in the spring of 1985 averaged 3492 kg/ha in 1985.

On the other hand, our experience indicates that Russian wild ryegrass is unlikely to establish satisfactorily unless it can be seeded into land

which has been either cropped with cereals or summerfallowed for one or more years so that grassy species and viable forage seeds have been largely eliminated. The Russian wild ryegrass which we seeded following extensive cultivation established only on the higher, drier land located within each paddock. The RWR was not sufficiently competitive either during the year of establishment or subsequently with the result that it constitutes only a minor percentage of the total sward in most paddocks.

The sod seeding of meadow bromegrass and alfalfa using Roundup for total vegetation control did not establish satisfactorily. This method was tried as an alternative to rebreaking rough stoney pasture land and cannot be recommended due to the high cost of the herbicide and uneven seed germination.

The 6-field rotationally grazed, fertilized and reseeded treatment required 1.19 ha/cow and produced 118.7 cow grazing days/ha. The 4-field system required 1.16 ha/cow and produced 108.4 cow days/ha while the control areas required 1.80 ha/cow and produced 68.2 cow days of grazing/ha.

The 6-field system produced 43.9 and 90.8 kg/ha of cow and calf gain respectively, the 4-field 43.6 and 88.1 kg/ha while the control pastures produced 24.5 kg/ha of cow gain and 57.9 kg/ha of calf gain.

Cows commenced grazing on average the last week of May for 143 days on the 6-field system, first week of June for 129 days on the 4-field system, and the second week of June for 117 days on the control. The earlier spring grazing on the 6-field system was attributed to the crested wheatgrass and Russian wild rye stands.

The current cost of rebreaking and reseeding in northeastern Saskatchewan amounts to $132/ha. This can be broken down to $45 for breaking, $48 for work down and $39 for seed. Amortizing this capital cost over 10 years results in an average annual cost of $13.20/ha plus interest charges.

It is questionable at this time whether the yearly amortized seeding costs plus the yearly fertilizer costs totally $53.62/ha could be paid for from the small increase in calf gain per hectare on the 6-field system.

However, there are added benefits of providing adequate early spring grazing on pastures. With the estimated present value of barley of $87/t, the costs of feeding a cow silage, straw and grain while nursing a calf is approximately 73¢/day. Thus for every day a cow is on pasture the farmer saves 73¢ in winter feed costs. During the past 5 years cows have been able to graze on the 6-field system seven days earlier than on the 4-field system. Thus it was worth $5.11 (7 days @ 73¢/day) to have the cow grazing one week earlier. This would only partly offset the added annual cost for breaking and reseeding the pasture.

It is doubtful that the cost of rebreaking and reseeding an existing pasture stand can be offset by increased carrying capacity and gain/ha relative to rejuvenation by fertilization only. In our work it has taken 10 years to complete the cycle of reseeding all six paddocks. At present we

have usually only been able to graze 5/6 of the land area each year as 1/6 is usually broken or in the process of being reseeded. It appears that the rebreaking and reseeding would be an ongoing process over the years as the RWR seeded in 1975 has now reverted back to a volunteer stand of former grasses.

In conclusion, the cost of fertilizer can be paid for from the value of the increased calf gain if the farmer owns his own land. Depleted stands can be rejuvenated with the application of fertilizer every other year. It is doubtful that it pays to rebreak and reseed existing pasture stands in addition to applying fertilizer. However, it is advisable to provide some form of pasture for early spring grazing such as crested wheatgrass. This allows the remainder of the pasture to have the opportunity to reach maximum grazing production during the rest of the year.

BEEF CATTLE MANAGEMENT BY OBJECTIVE

Ed Duren
University of Idaho

Cattle management by objectives essentially deals with two entities--cattle and folks. Basically, beef cattle becomes the resource for an educational thrust to motivate managerial involvement in both efficient and profitable management.

Once goals have been established and reasonable objectives determined; then a line of action (program) can be implemented and measured. A program can be put in place for a ranch, community, county, state, or province depending upon the need and desires of those individuals involved.

As the integration framework forms, people develop networks to solve problems, recognize opportunities, and rapidly transfer technology from research to the ranch or field observations to the laboratory. The flow of information may, and often does, flow in either direction to benefit the cattle industry.

The Idaho Total Beef Program is an educational integrated system based upon cattle management by objectives. The primary effects of cattle management by objectives may be observed in tangible results such as improved profits, shorter calving season, more rapid growth, increased calf survival, etc. The intangible effects may reflect pride in the ranch, self-satisfaction, peer recognition, improved employee morale, and strengthened team effort. These factors all have a direct and indirect benefit to the ranches participating and cooperating in the Idaho Total Beef Program.

Idaho Total Beef Program (ITBP), developed by the University of Idaho College of Agriculture, is an action program designed for producer benefit and is in harmony with the priorities of the Idaho beef cattle industry. In reality, the Idaho Total Beef Program is an integrated systematic total approach for improving both reproductive and growth efficiency, demanding a team effort to problem solving. In Idaho, the team may include producers, veterinary practitioners, Cooperative Extension staff, agriculture lenders, land grant university scientists, and allied industry technical representatives.

Let's examine what makes the Idaho Total Beef Program unique.

TECHNOLOGY BASE

Cattle management by objectives is essentially a system of incorporating known scientific technology into a more logical and effective pattern which requires a systems analysis to enhance the rate of adoption. Therefore, a total program demands the application of appropriate technology from diverse disciplines within animal agriculture.

TECHNOLOGY BASE

A research assessment of animal agriculture accrued through the USDA-land grand system resulted in a practical handbook of applicable beef cattle production technology. This reference presents a management system based upon the biological cycle of the beef cow.

The "Idaho Cow-Calf Management Guide and Cattleman's Library" is published by the University of Idaho College of Agriculture and distributed by the Idaho Cowbelles in cooperation with the county Cooperative Extension Service offices throughout the state of Idaho for a fee of $35. This reference is supported by appropriate audiovisual aids; i.e., twenty-four videotape and slide-tape cassette lessons utilized in various extension teaching methods. The technical information offered in the Idaho Total Beef Program includes the "Idaho Cow-Calf Management Guide and Cattleman's Library," and appropriate audiovisual aids. Each is continually updated with practical and reliable information gathered from cooperating ranches throughout various Idaho Exten-Search type projects.

Subsequent Idaho beef symposiums on the four key indicators expanded the technology base with published proceedings as listed.

Year	Key Indicator	Theme
1979	Open Cows	"Live Calf...A Key to Pleasure
1980	Calf Death Loss	"Calf Survival"
1981	Length of Calving Season	"Roadblocks to Calf Profit"
1983	Growth	"Growth, the Total Product"

The "Idaho Beef Herd Improvement Program," a computer analysis of herd records, is a vital tool with a management input to system analysis as influenced by reproduction and growth. Performance records in commercial herds provide producers with information for maximizing growth management of their herds as well as individuals within their herds. These records can be used to pinpoint factors in the environmental system that can be changed so that growth potential will be maximized and potential profit increased.

The Idaho Beef Council funded a substantial financial grant to the University of Idaho Cooperative Extension Service to generate micro computer software to strengthen educational thrust of the Idaho Total Beef Program, an IRM concept to improve reproductive and growth efficiency.

The second phase of the Idaho Total Beef Program, the growth management of stocker cattle, has been developed beginning with a companion technical reference of a "Stocker Management Guide and Cattleman's Library" for the western region.

The technology base continues to expand through the cooperation of western livestock extension specialists and research scientists in the land grant university system. The management of the vast information base is rapidly expanding at a rate which will, in the near distant future, make the notebook approach obsolete. At this point in time, electronic technology will be systematized to allow ready access by all interested individuals. There will come a time when computers or other electronic media may completely replace the published reference.

PROBLEM ORIENTED

Beef cattle will respond in a given environment to the limit of their genetic capability or to the limits set by the environment. The environment is everything that interacts with that beef animal.

The environmental system must be managed properly to optimize growth and maximize economic returns. Then it is understandable, a manager must learn how to analyze the system and measure progress. Bench marks arrived from field data must be established for the key indicators in the cow herd management. Reference data can be utilized to identify problems and measure progress in the management by objective.

Currently, the Cow-Calf Management Guide is divided into twelve (12) distinct management activities, each with a management objective. This is complimented by the Stocker-Feeder Management Guide divided into eight (8) distinct management activities with an appropriate management objective. Each activity and management activity can be applied to an individual or multiple ranch program.

If profitability and competitiveness becomes a reality on the ranch and within the industry, production, financial, and marketing must become efficient through management and educational programs. A total management program results when these are blended for optimum production and minimum profitability at the ranch.

Currently, the educational thrust of the Idaho Total Beef Program is to improve the reproductive and growth efficiency of the cow herd. This direction and emphasis resulted from the collection of base data with both producer and professional cooperators. Examples of typical ranch data do appear with each measurable key indicator. This data collected during the processing of cattle can be assembled in the Idaho Total Beef Program pocket field book and summarized by computer according to the key indicators.

MEASURABLE INDICATORS

There are four production KEY INDICATORS of the management level in a commercial cow herd. These four indicators can easily measure the performance efficiency of the herd. Furthermore, these are understood by agriculture lenders because each can be measured to demonstrate progress.

The first of these, and the one that has the largest economic impact, is OPEN COWS. If it takes $350 plus to keep a cow for a year, it doesn't take long to figure out that 14-20% open cows will knock a large hole in the cash flow. The number of open cows is a herd performance record that anyone can keep. This information is readily available in the fall if cows are pregnancy tested and available in the spring by simply counting the dry cows.

As an example, in the fall of 1981, the Idaho Extension Livestock Specialists' 841 Planning Unit conducted a survey for open cows. The results are rather interesting. Six veterinary clinics cooperated in the survey with thirteen practicing veterinarians reporting their pregnancy examinations on client beef cow herds. The participating clinics were located across southern Idaho. The following table summarizes the overall results:

Total cows and heifers.....17,378
Percent open.....11% (Range 0-25%)

The open cow problem is about what you would expect in Idaho. The problem becomes much more serious when you combine those cows that are calving 80+ days into the calving season with the 11% open. You are looking at roughly 26% of the cows as reproductive failures.

The second KEY INDICATOR is the LENGTH OF THE CALVING SEASON. In those cow herds that do not have a seasonal calving system, days from the last calving or calving interval is the KEY INDICATOR.

In the 1981 survey summary, one can observe less than 50% of the cows will calve in the first 40 days of the calving season.

Percent calving in first 40 days....46%
Percent calving in second 40 days...28%
Percent calving in 80+ days.....15%

A reproductive failure then becomes a growth inefficiency. This is important when you realize for each day one calf is younger it will be 1.5-2 pounds lighter in weight. One heat period of delayed breeding resulting in a longer calving period represents a calf weight loss of 30-40 pounds per heat period; producing a lighter weight calf at weaning, the normal sale date of many western ranches. When translated into dollars, a long calving season becomes the biggest "robber" in the beef industry. In terms of paying bills with those lightweight calves, reproductive inefficiency is the major problem in the herd.

The third KEY INDICATOR to analyze is CALF DEATH LOSS. These losses may vary among ranches but seem to range from 2-3% on some ranches and up to 25-30% on other ranches. The reason for this wide range can be attributed to the annual variation in ranch management and the accuracy of the reporting. We are beginning to get a handle on this in Idaho. Annual calf losses will vary somewhat by season but are consistent with ranch management. Preliminary indications are that annual baby calf losses vary from 12 to 40 percent or more on many Idaho ranches. Nationally the USDA statistics suggest annual losses in a range of 12-15 percent. It is most important that this key indicator of production is determined on a herd, county, and state basis.

The fourth KEY INDICATOR of production is GROWTH. Beef cattle management is really growth management. Growth being the major product sold. It is important to realize that total growth of the herd is a composite growth of the individual's and the total growth produced by the herd. There are actually two systems which impact growth; namely, the individual's growth, which is a product of the breeding system, and the total herd growth, which is a product of the management system. It is the management system that sets the priority limits of tolerance for open cows, length of the calving season, death loss, and minimums of growth.

KEY CAUSES

Now, if you analyze the production system from these four KEY INDICATORS, there are only four KEY CAUSES of variation in levels of production in each of these. Let's run an example of open cows through the systems analysis flow chart to see what happens. (Refer to the Boise River Project Flow Chart.) Remember there are only four KEY CAUSES to open cows.

BOISE RIVER EXTENSION PROJECT

(A RESULT & METHOD DEMONSTRATION)

300 HEAD COW HERD

FLOW CHART OF TBP APPROACH

DATA BASE	KEY INDICATORS	KEY CAUSES	KEY APPROACH TO PROBLEM ISOLATION	KEY PROBLEMS IDENTIFIED	KEY MANAGEMENT CHANGES	KEY RESULTS
PERFORMANCE RECORDS	OPEN COWS (23%)	DISEASE	PHYSICAL EVALUATION CLINICAL TESTS	NO PROBLEMS NO PROBLEMS		
		BULLS	PHYSICAL EVALUATION CLINICAL TESTS	1 GIMPY NO PROBLEMS	SOLD 1, GIMPY	
		NUTRITION	FEED ANALYSIS CLINICAL TESTS	LOW Se, CU, CA, P LOW Se, COPPER	SUPPLEMENT Se, CU, , P.	93% CONCEPTION
		MANAGEMENT	REVIEW MGT. PROGRAM PARASITE CONTROL RECORDS-SUMMER PASTURE	HIGH FLY POPULATION	ECTRIN EAR TAGS	LESS FLIES
	CALVING SEASON (140 DAYS)	DISEASE	PHYSICAL EVALUATION CLINICAL TESTS	NO PROBLEMS	VACCINATION PROGRAM	60-DAY CALVING SEASON
		BULLS	PHYSICAL EVALUATION CLINICAL TESTS	NO PROBLEMS		
		NUTRITION	FEED SAMPLES CLINICAL TESTS	LOW Se, CU	PREG TEST -CUT OFF LATE ONLY HEIFERS OF SUFFICIENT SIZE KEPT & BRED. BULLS IN 1 HEAT THEN PREG TEST	
		HEIFER DEVELOPMENT	CHECK FOR SIZE, AGE, CHECK PERF. RECORDS	50% LARGE ENOUGH TO BREED		
	CALF DEATH LOSS (7%)	DISEASE	NO CLINICAL SIGNS OF DISEASE		COMPLETE VACCINATION PROGRAM+BoSE	REDUCTION OF 5.5%
		NUTRITION	NURSING	SUPPLEMENT	SUPPLEMENT	
		MANAGEMENT	SAME AS COWS			
	GROWTH 352 LB W/W, 232 DAYS/AGE	NUTRITION	FEED ANALYSIS LEVEL OF FEEDING	LOW Se LOW COPPER	SUPPLEMENT Se, CU	HEIFERS 87 LB HEAVIER THAN 1981
		PARASITES INTERNAL & EXTERNAL	EXAMINE FOR EXT. INT. PARASITES	HIGH INT. POPULATION. SOME EXT.	WORM CALVES POUR ON	STEERS 60 LB HEAVIER
		DISEASE	CHECK FOR CALF DISEASES	SOME BVD, PI3 IBR SUSPECT	VACC. PROGRAM FOR CALVES	
		GENETICS	EXAMINE PERFORMANCE RECORDS OF COW HERD & HERD BULLS	VARIATION IN PERFORMANCE	COW EVALUATION & CULLING	

KEY ACTIVITIES TO ADOPTION

INFORMATIONAL (MEETING)

A. DISCIPLINES REPORTED WHAT EACH CONTRIBUTED TO PROJECT RESULTS

B. PROCESS OF TBP-APPROACH EXPLAINED

C. LIST OF PRODUCERS PRESENT OBTAINED- (70 PRODUCERS PRESENT)

D. NEWS MEDIA PRESENT- RADIO, TV, PRESS

E. NOTICES OF MEETING SENT TO LIVESTOCK PRODUCERS ON THE BOISE RIVER

F. PUBLISH COMPLETE REPORT OF ACTION ON PROJECT.

FOLLOW-UP (SURVEY OF PRODUCERS)

EXTENSION AGENTS SURVEYING FOR BASE DATA FROM EACH PRODUCER ATTENDING MEETING.

(ANALYSIS OF DATA COLLECTING)

1. IDENTIFY AREAS OF OPPORTUNITY AND IMPACT KEY PRODUCTION INDICATORS.
2. IDENTIFY POSSIBLE AREAS OF RESEARCH.
3. IDENTIFY PRODUCERS THAT HAVE SIMILAR DATA WILLING TO COOPERATE IN FURTHER DEMONSTRATIONS.

NUTRITION is usually the first cause that comes to mind. This is legitimate because nutrition is without doubt the most common problem in getting cows to breed and conceive. In the Boise River Project, nutrition was a significant problem revealing a mineral deficiency which, when corrected, produced measurable results in conception rate.

The second thought that comes to mind is DISEASE. There are some diseases implicated in the open cow picture. Most of the health problems in reproduction can be dealt with very successfully. However, another problem with open cows may be REPRODUCTIVE SOUNDNESS. Sometimes bulls are not as fertile as they could be, nor as young, and are not as sound as they once were. Maybe there are not enough bulls for the terrain. There are a number of reasons why bulls could be the cause of some open cows.

We can't get MANAGEMENT or environmental manipulation out of the picture as a possible KEY CAUSE. Management at this point is gross management, i.e.: Were the bulls out? Did the cows have enough feed? Were the females cycling?

What is the next step in analyzing the system? Let's take the possible KEY CAUSE, DISEASE, and follow it through some steps of the analysis flow. There must be some key things to do to determine the possible cause of open cows in relation to disease. As far as disease is concerned, there are two things we can do. We can give the cows a physical exam to determine their reproductive soundness and give them a clinical exam to determine if disease is implicated. If disease is implicated we should come up with an answer after the two examinations. For example, let us say there were no problems in the physical exam. The clinical exam revealed that Vibrio was probably the key problem. The next logical step is to recognize that a change in the system of management needs to be made. the KEY CHANGE would be a vaccination program for Vibrio.

The KEY MANAGEMENT CHANGE (i.e., Vibrio vaccination) can then be measured back against the base data for some KEY RESULTS. In this case, it should show up as a decrease in the number of OPEN COWS as a KEY INDICATOR of production level. If management changes do not impact the key indicators, they may not be too important in contributing to the production efficiency of a cow herd.

IMPACT PROJECTS

The system analysis approach of the Idaho Total Beef Program is practical and sound. This has been successfully executed and demonstrated on two completed Idaho field projects with several other projects now in the planning, development, and implementation stages of three to five years. The two completed projects were identified as Pegram and Boise River.

Pegram -

One was the Pegram Project (3 herds, 1600 cows) in southeast Idaho. The KEY INDICATOR, baby calf death loss, was reduced from 26% to less than 2% in a three-year period.

The key objectives of the Pegram Exten-Search Project were to:

1. Prioritize and implement management changes to minimize death loss in young calves.

2. Develop an effective economical disease control program to minimize death loss in young calves.

The ultimatum of the Idaho Beef Council, associated with the funding of this project was to develop a system for saving calves with any or all known and unknown techniques that can be profitably demonstrated to a cow-calf producer. The Idaho Calf survival problem, readily identified by the Idaho Beef Council, became an industry crusade and a University of Idaho challenge which attracted national interest by the beef cattle industry.

Boise River -

The Boise River Project is a method and result demonstration where the problem was open cows. At least this was the point of trauma to the rancher when 23% of 350 cows were diagnosed open. Fortunately, this rancher had two years of herd records. He had--in addition to 23% open cows--a 140-day calving season, 7% death loss in calves and 352 pound weaner calves at about 250-days on irrigated pastures. By going through a systematic analysis on each of the four KEY INDICATORS, it was discovered that the major cause could be a mineral deficiency--selenium and copper. The KEY MANAGEMENT change made was a mineral supplementation program. Herd performance the succeeding year resulted in a 93% conception, 60-day calving season, and 1.5% death loss. Weaner heifer calves were 87 pounds heavier and steer calves were 60 pounds heavier than the previous year. For more complete detail, see the attached flow chart on the system of analysis.

RANCH DEMONSTRATION

The Mission Creek Project (MCP) was undertaken to evaluate through practical application and field procedure certain technology available in alleviating deficiencies in selenium and copper. The choices available were oral supplementation or supplementation by injection. It was not known at the beginning of this project if the injectable products available would give or maintain adequate levels of either deficiency or would impact production if given during the normal working times of the cattle.

The practical side of the MCP was to determine if these injectable products would provide adequate levels of selenium and copper and impact the performance of the cattle. This would be important to producers who want to supplement their cattle when grazing in common with others. They could do so without the problems of oral supplementation in mixed ownership cattle. Also incorporated in the study was the field testing of a new pregnancy diagnosis procedure against rectal palpation and subsequent calving.

Important in the MCP was the demonstration of the integrated approach by the Nez Perce County Extension Livestock Advisory Committee, producer, veterinarian, research and extension personnel.

The MCP is an example of the integration of technology and people in an on-ranch demonstration. The value of the project is two-fold; one is the findings of the project in relation to its objectives and the other is process of bringing the people of various expertise and experience together to solve a problem or demonstrate at the local level the need to adopt new technology.

CALVING MANAGEMENT WORKSHOPS

A typical example has reflected the producer concerns of calving management workshops as a lead to implementing county Total Beef Programs. These workshops employ the experience and expertise of University of Idaho staff with teaching support from practicing veterinarians and selected experienced producers utilizing information generated from the Idaho Pegram Project.

These workshops provide a "hands-on" experience for the young beef producer as the target audience. Approximately 36-40 hours of intensive instruction is offered via formal lecture (15-20 hours) audiovisuals, both videotapes and slide-tape cassettes, field technique demonstrations, calving equipment, and ranch tours.

The teaching materials and audiovisuals are selected from the "Idaho Cow-Calf Management Guide and Cattleman's Library" published by the University of Idaho College of Agriculture.

Calving Management Workshop participants respond more enthusiastically to the hands-on educational process of the workshop in contrast to a typical extension "road show type" one-day meeting of cafeteria-style information. The basis for this is that the workshop provides an educational foundation upon which to build the educational interest of the producer in a problem-solving mode. The sharing of experience and technical information flows freely and with confidence between participant and instructor.

Once a workshop has been conducted, participants rapidly pursue the implementation of the technologies shared and the application of this information to their associated ranch. Within a relatively short period of time, one to two calving seasons, professionals readily observe marked changes in herd management on participating ranches. These changes can be measured.

AGRICULTURE LENDERS SEMINAR

A series of seminars by geographic regions in Idaho have been successfully conducted by the University of Idaho to acquaint agricultural lenders with the Idaho Total Beef Program. The seminars were sponsored by IMC, Veterinary Products Division.

Agricultural lenders, during the loaning process, assist producers in analyzing the status of herd management. This is accomplished very easily by simply reviewing the Cow-Calf Management Checklist available to all Idaho agriculture lenders. The Cow-Calf Management Checklist serves to identify and prioritize areas of management which may assist in improving the reproductive efficiency of the herd by allocating financial resources and seeking the appropriate technology.

The checklist also offers insight to county beef program planning committees in meeting the educational needs of beef clientele. The Cow-Calf Management Checklist was developed by cattle industrywide participation in the 1983 "Make It Happen" workshop sponsored by the Idaho Cattleman's Association and the Idaho Cattle Feeders' Association in cooperation with the University of Idaho College of Agriculture.

The Idaho Veterinary Medical Association has complimented the Agriculture Lenders Seminar with an appropriate support publication entitled, "Agriculture Lenders Economics: The Influence of Veterinary Services Upon Producer Profits and Ability to Repay Agriculture Loans." This copyrighted

University of Idaho

College of Agriculture
Cooperative Extension Service

COW-CALF MANAGEMENT CHECKLIST

_____ 1) Are your cows tagged?

_____ 2) What are your costs per cow unit?

_____ 3) Performance records (BCI).

_____ 4) Herd Health.

_____ 5) Recognize disease problems.

_____ 6) Pounds of calf weaned per cow?

_____ 7) Preg test cows?

_____ 8) Length of calving season?

_____ 9) Have you checked the need for mineral supplements?

_____10) Do you have an implant program?

_____11) Forage analysis.

_____12) Do you do a breeding soundness evaluation on your bulls?

_____13) Do you have a long term plan to increase weaning weights?

- _____ a) Crossbreeding
- _____ b) Better bulls

_____14) Do you have a range improvement plan?

_____15) What is your marketing plan?

- _____ a) Have you considered alternatives?
- _____ b) Do you do any market charting?

_____16) Heifer weights at breeding time.

_____17) What are your objectives?

- _____ a) This year?
- _____ b) Five years from now?

Developed at the "Make It Happen" workshop 1982. Sponsored by the Idaho Cattlemen's Association, Idaho Cattle Feeders Association in cooperation with the University of Idaho, College of Agriculture.

IMC RALGRO®
International Minerals & Chemical Corporation

COW-CALF MANAGEMENT CHECKLIST REFERENCES

The following reference material will help you put your operation in a positive relationship to the questions on the reverse side.

1. There are many advantages in beef cow management if cows are tagged with a number for reference. Cow-Calf Management Guide Cattleman's Library - CL 730.

2. Without knowing what your costs are per cow unit it is almost an impossibility to become more efficient. Idaho Livestock Budgets Misc. Series - #71, University of Idaho, College of Agriculture.

3. Performance records tell us where the opportunities for improved management are and are monitoring our present management. University of Idaho Beef Cattle Improvement program - See your County Extension Agent.

4. A good, sound herd health program is basic to making all other management work successfully. Cow-Calf Management Guide Cattleman's Library - CL 600 - 695.

5. Recognition of disease problems is helped immensely when good health records are kept. Cow-Calf Management Guide Cattleman's Library - CL 695.

6. Pounds of calf weaned per cow is one of the keys to profitable beef production. Idaho Beef Cattle Improvement Program - See your County Extension Agent.

7. Pregnancy testing tells you more than whether a cow is bred or not. Cow-Calf Management Guide Cattleman's Library - CL 410, 412.

8. Length of the calving is one of the more critical factors in profitability. Idaho Beef Cattle Improvement Program - See your County Extension Agent.

9. Mineral Supplements are probably the most neglected area of beef cattle nutrition. Cow-Calf Management Guide Cattleman's Library - CL 300.

10. Growth implants in calves pays ten to one. Cow-Calf Management Guide Cattleman's Library - CL 755.

11. Unless you know what the feed analysis of your feed is you do not know if you are meeting the needs of the cattle. Cow-Calf Management Guide Cattleman's Library - CL 300, 310, 312.

12. Sound fertile bulls are a must in getting a high percentage of the cows bred in a short time. Cow-Calf Management Guide Cattleman's Library - CL 425.

13. Breeding plans are a long-time program and require dedication. Cow-Calf Management Guide Cattleman's Library - CL 1000, 1020, 1035.

14. Range and pasture improvement and maintenance should be a major part of the overall management program. Cow-Calf Management Guide Cattleman's Library - CL 500, Idaho Forage Handbook.

15. Marketing is usually an afterthought in beef cattle management. Cow-Calf Management Guide Cattleman's Library - CL 800, 805, 815, 825.

16. Proper development of heifers is one of the best investments in time and money. Cow-Calf Management Guide Cattleman's Library - CL 345, 415.

17. Without some clearly identified goals and objectives you will never know where you have been or where you are going. Cow-Calf Management Guide Cattleman's Library - 900, 910, 915, 920, 925.

other ranch problems seeking professional assistance in solving these problems by integrating appropriate support from various sources in a team effort. Consequently, a team composed of extension agriculture agent, veterinarian, banker, and producer becomes more involved and more effective in dealing with the respective ranch. As problems are attacked on a team basis, the challenge becomes a part of the motivation to the key people involved to rapidly integrate by developing and implementing the Idaho Total Beef Program for a specific ranch or a group of ranches within the community.

SUMMARY

The Idaho Total Beef Program is a building process in a problem-solving mode based upon the integration of scientific information as applied to one or more ranches within a community associated with a common problem. The program can be directed to a ranch, a community of ranches, or a countywide extension educational beef program for which a problem of concern has been identified. The Idaho Total Beef Program is definitely a problem-oriented action program of integration to improve the reproductive efficiency of Idaho's cow herds. Progress in the Idaho Total Beef Program can be measured with appropriate key indicators selected from established bench marks reflecting the problem, cause, and effect of cow management.

Therefore, under the system of analysis, the Idaho Total Beef Program continues to grow much like the growth performance of cattle from birth to slaughter under the environmental influence of management. The problem-solving mode moves from the simple to the complex and with selected key indicators, the results are measurable! The full impact of the Idaho Total Beef Program is never fully completed simply because it is open ended and can apply to all levels of management and technological capabilities.

The Idaho Total Beef Program is a total systems approach for integrating both technology and people in a problem-solving mode to achieve results in the management by objective of a commercial cow-herd.

The program constitutes a logical progressive line of action supplemented with educational activities, each contributing supporting information delivered by involved competent people with a sincere interest in problem solving.

It is based upon people through change:

1. Problem identification - base data
2. Technology transfer
3. "Hands-on" educational activities
4. Systems analysis

publication prepared at the University of Idaho in 1985 will, no doubt, go nationwide as other state veterinary associations join in active participation in the state IRM programs.

PEOPLE INVOLVEMENT

In response to the frequent inquiry, "How do you start a program?" the astute extension workers start with people--both beef producers and professionals. Furthermore, the program begins where the key people perceive the problem, which logically can be categorized within any one or more of the four key measurable indicators.

At that point forward, the educational process begins to take shape from a suggestion in the committee meeting to the final successful solution, all within the framework of the multi-discipline and multi-functional problem-solving mode.

In developing a state or county Total Beef Program, it is motivated by knowledgeable key people willingly contributing to a data base. Field data; i.e., open cows, dead calves, etc., is essential to problem identification, priority determination, and program direction by beef industry leaders. This data can be collected by producers on the ranch with the use of the Idaho Total Beef Program red pocket field book distributed statewide by veterinary practitioners and county extension agriculture agents.

Participation, involvement, motivation, and commitment are the instruments in getting the act together. With people in place fully informed, the educational process will result in a "hands-on" experience long to be retained.

The Idaho Total Beef Program is not the reference material, computer software, or the "road show" meetings; but more specifically, it is a line of action which involves the cooperation of people in the educational process to speed up the rate of adoption and flow of technical information from scientist to producer. Impact projects serve to demonstrate the practical application and cost/benefit of the technology.

Producer awareness to the problem associated with a weakness in resource efficiency within the herd is a result of a series of educational activities and county extension functions. Each activity must build upon the previous activity and not be an end to itself. The activities may be the result of applying one or more educational tools of support that may include--but are not limited to--meetings, demonstrations, committees, impact projects, audiovisual aids, or Idaho Cattleman's Handbook.

Change does not cease with the ending of the activity; i.e., workshop. Producer participants become conscientious of

5. People involvement and commitment
6. Measurable results
7. Improved delivery system
8. Communication and accountability
9. Professional problem-solving team
10. Integration of USDA and land grant units

The Idaho Total Beef Program has been effectively demonstrated to be a continuous process of education successfully executed at the grass roots level by enthusiastic leadership. It can be implemented at a community, county, state, regional, and national level with measurable results.

In looking ahead to management in the 80's, the day is gone when we can operate a cow outfit out of our hip pocket. We must remember we are the largest impactor on the production of our ranches because we manipulate the environmental system through our system of management. We must have a system of analysis on the KEY INDICATORS of level of production. We must be willing to change. All of the technology in the world is useless until it is incorporated into the management system. Seldom will we be successful unless we use an interdisciplinary approach. In Idaho we call it the Total Beef Program, nationally it is called Integrated Resource Management. You, who are producing cattle, need to obtain all of the technology available, and incorporate as much as you economically can into your management. Those of us in education need to be innovative in our efforts to speed the rate of technology adoption. We have read that from time of discovery of technology to general adoption is 7 to 15 years, 12 years average. This is definitely too long in these fast changing times.

We in Idaho look forward to the 80's and 90's because they are going to be exciting. What opportunities exist in your state, area, or community? Furthermore, what will you do to make it happen?

FACTORS AFFECTING THE FUTURE VIABILITY OF THE CATTLE INDUSTRY 1/

Maurice Kraut

Introduction

In contrast to other agriculture sectors, 1986 was a bright year for red meat producers. For the first time in nearly a decade, cow-calf producers became optimistic about being in the cattle business. This sense of well-being amongst red meat producers enabled the bitter memories of financial misfortune and emotional stress to rapidly fade from memory.

The events that caused the hardships of previous years, the actions that were taken to alleviate the effects of the unprofitable years, and the results of our collective actions, clearly demonstrated our inability as an industry to cope any differently than our predecessors of fifty years ago.

This presentation will identify some of the pit-falls of yesterday and tomorrow, as well as endeavor to present some suggestions by which one may better cope in the future.

The Environment

There are four major factors that have affected the cattle industry in the past, and will undoubtedly continue to affect the cattle industry in the future.

1/ Paper presented to the Manitoba Beef Cattle Seminar Agricultural Extension Centre, Brandon, Man., January 21, 1987

-- Governments
-- Consumers
-- Other agricultural sectors
-- Cattle producers

These above factors can be expressed as factors external to the cattle industry and agriculture, and those factors directly involved in, or internal to the cattle industry. Some examples of external factors would be:

-- The level of employment
-- The rate of inflation
-- The value of the Canadian dollar
-- Interest rates

What is most important about the external factors is that all are man-made. These factors are the results of governments internationally, nationally, and provincially, making decisions in order to achieve desired cultural, social, and economic objectives. The effects of these actions have long-ranging impacts on the cattle industry. Some glaring examples of this type of event would be, OPEC price controls, EEC support of agriculture, the U.S. Farm Bill, Canadian Feed Grains Policy, the Crow Rate, and inter-provincial competition policies.

The internal factors represent primarily input cost variables of the cattle industry and the relative competitive position of beef versus other meats.

Some examples of policies or programs that affect the internal factors would be the current one billion dollar pay-out to the grain industry, the impact of determining both price and quantity produced by the regulated commodities, and perhaps the impact of income support programs across Canada.

Government policies and programs affects an industry's environment in two ways, positively or negatively. It cannot change the basic direction that an industry is headed toward, only modify or enhance the results of going in that direction. Just as nature has its' methods of maintaining a balance in its' environment throughout the World, World economies have their own systems of checks and balances that governments can't change. Ironically as governments everywhere become more involved with trying to change the imbalances created by the economic systems, economic volatility has increased not decreased.

It is this increased environment of risk and uncertainty that holds the greatest threat to the future viability of the livestock industry. It is also within this environment that participants must make the correct decisions, in order to survive. The methods that were used yesteryear and even today have been shown to be largely inadequate. What is to be used for the next crisis?

Being an efficient producer or a good financial manager is not enough. Producers will have to develop the ability to acquire, process, and analyze considerably more information than ever before. This information that producers will have to acquire is not more knowledge about feed efficiencies, rations, animal health, machinery systems, or, financial management, no matter how important they may be. Cattle producers will have to develop production strategies that better reflect market opportunities and risks. Cattle producers will have to recognize the impact of government programs before they are implemented, and will have to know and promote their product as never before.

The last two decades has seen a revolution in western canadian agriculture. It has been the age specialization. There aren't too many farmers around today that have more than one enterprise on their farms. They are either grain farmers, hog farmers, cattle farmers, dairy farmers, and so on. While there are many reasons for this to have occurred, there is one common result for all, <u>increased risk and uncertainty</u>. In order to counter this increase in risk and uncertainty, one has to have more and better information as to current and future events that may occur within agriculture. Because farmers are more specialized the

factors affecting price and quantity in one agricultural sector has an greater impact on all agricultural sectors than in the past.

A very real danger is that as farmers have become so specialized, there is less likelihood of switching resources from an agricultural sector. Consequently, supplies can increase or decrease faster than warranted, thus rapidly affect the economic conditions in related, but more profitable agriculture sectors(with the possible exception of the regulated commodities).

This danger has become compounded by government agriculture policies around the World. With all the good intent on the part of governments to maintain social and economic well-being in agriculture, governments actions have unintentionaly contributed to a further deterioration of that well-being. Until the 'real' agriculture problems are identified, governements will continue to treat the symptoms rather than the cause of agriculture problems.

The Consumer

There are three primary requirements to run a successful business; know your product, know your costs, and know your market. Until recently little, if any publicity has been directed toward improving consumer demand for beef. The Canadian Cattleman's

Association and the Manitoba Cattle Producers Association, has for years been promoting the virtues of eating beef, with debatable results.

For a great many years the cattle industry has relied on an image of product superiority to other meat commodities to maintain consumption levels of beef. In case it hasen't been noticed, until this past year, per capita beef consumption has been declining since 1976. A great many cattle producers still think that the market for their product is the auction ring, meat packers, or other cattle producers. This may be the result of incorrect product identification. Cattle producers really market grain finished beef, manufacturing beef, or unfinished beef. As a result, the market for the cattle producer is in fact, the consumer.

How much do cattle producers really know about this Consumer? How much money is the Consumer prepared to pay for food? How much of this is the Consumer prepared to pay for meat? How much of the amount the Consumer is willing to pay for meat, will be spent on beef? How much of the amount spent on beef, will be spent on high quality beef? How does one convince the Consumer to spend more money on beef?

Quite obviously these are a great many questions. Unfortunately, most of these questions have no firm answers. More disturbing however, is that there are still more questions relating to the Consumer, with no answers. Yet, given the structure of the North American cattle industry (primarily grain finishing), the answers are singularly important to the long-term well-being of the cattle industry and its' producers.

It would seem rather apparent that one of the primary requisites outlined earlier, knowing the market for your product has not been entirely satisfied. To this end it is suggested that the following three areas should be adressed:

-- more beef product research and development

-- greater public awareness of beef

-- a greater producer commitment to improving their own market awareness

Government policies that affect employment levels, income tax levels, interest rates, exchange rates, and inflation rates, have a direct impact on the amount and type of beef consumers will purchase. Therefore, in addition to the cattle producers concerns about the very same issues, it is also in their interest to maintain consumer well-being. Coincidentally, consumers

should be aware, that to maintain a viable dynamic cattle industry is also in their best interests.

Understanding the Role of the Market and Marketing

When the price of cattle or calves is high, such as happened in the past year, very little is heard of the lack of competition in the marketplace, or the inequitable prices received by cattle producers. When prices are low, it's another matter. Everything and everyone receives part or all of the blame for the misfortunes that have befallen the cattle producer. Why? The market channels haven't changed because price levels change. Part of the answer to this perennial problem lies with what may be a misunderstanding as to the role of the market channels. If, one perceives these market channels as bearing the responsibility for providing adequate income flows to cattle producers, it becomes somewhat understandable why cattle producers or other agricultural producers, point to the marketing system as being responsible for their lack of adequate price levels. However, that may not be the role of the market system or the market channels. Technically speaking, the role of the market channels is to move the product through the system to the consumer as quickly and efficiently as possible; to express the value of the product quickly and in an undistorted manner, so

that the appropriate production and marketing strategies can be developed. The cost associated with the marketing system is termed market efficiency. The discovery of price is called arbitrage. The more efficient the market channels are the less cost is associated with marketing and processing the product. The more effective price discovery is, the greater the share of the maximum potential price is received by the producer. No where in the system are there profit guarantees for anyone. To understand this, is the beginning of being able to objectively evaluate the signals the marketplace provides. In turn, the producer will have taken the first step in reducing the considerable risk and uncertainty that continues to exist in the cattle industry.

It has been estimated that most farmers spend 80% of their time in the planning and production of their commodities, 9% of their time managing their operation, 10% of their time complaining about the weather, prices, or the ice in the curling rink, and 1% of their time in marketing their product.

Does this happen because farmers perceive they can have little effect on prices. Is the market so complex and confusing that farmers can't understand it? Is it because farmers have a full-time job producing and managing a farm enterprise? Perhaps farmers

spend so little time on marketing because they are so good at it already.

Actually farmers do know a great deal about marketing, although there may be some problems in understanding the market. For example, in 1985 cattle producers noticed an improved demand and price for bred cows. Some cattle producers viewed this as an opportunity to cull some older or inadequate bred cows at a premium price. Some producers sold their entire herds. Some producers expanded their herds. Whatever decisions were made and for whatever reasons, the improved price for bred cows was a signal. Outside of the cattle industry this signal probably meant nothing. However to the cattle producer, it could have meant at least four things;

-- the price of calves was high enough to create interest in herd expansion

-- next year could be even better

-- a government program was extremely profitable

-- it's time to get out of the cattle business

Discounting the government program most of the planning is a reflection of next year's production plans and not a very clear or certain picture of the future beyond next year.

A market analyst's perception of this same event might be along the lines of the following:

> "In North America, 1986 fed steer and heifer prices have increased due to improved consumer demand. The improvement of consumer demand is a reflection of improved economic activity and low inflation rates. This improved demand together with declining grain prices has provided for rapidly increasing calf prices. In turn this will provide the proper environment for herd expansion."

As can be seen this analysis is almost identical with what the hypothetical cattle producer on the previous page was thinking. However, the balance of this analysts's perception shows where the difference lies.

> " 1987 fed steer and heifer prices will be determined by whether the current rate of inflation and overall economic activity are maintained at current or better levels. The potential for 1987 fed cattle prices to improve over 1986 price levels is extremely limited. In fact, there is considerable potential for feeder cattle and calf prices to decline from the current high levels. As a result, caution should be used in utilizing current prices as a basis for production decision-making for 1987.

The major differences between the example cattle producer and market analyst is not one of education or ability, but subjectivity and objectivity.

The cattle producer reflects more of a self interest in his decision-making, which is of course natural, but subjective. The analyst with considerable less to risk by being wrong can be objective. This is not to say that all cattle producers should rush right out and find a market analyst. Rather cattle producers can and should develop the ability to plan in a more objective manner. In order to this effectively, more time and effort has to be devoted to what the marketplace is saying and less time and effort in proving the marketplace is wrong and faulty.

To this point, what has been adressed are the factors that have a considerable influence on the cattle industry and some reflection on the interpretation of their impact. Clearly, there is considerable room for improved understanding of marketing and marketing systems, by cattle producers, consumers, and governments. The following are specific examples of these factors, as well as their potential impacts for 1987.

Some of the major concerns that are current, or will shortly become a factor in the cattle industry, deal with government policies as well as the marketplace.

-- The European Economic Community's pending appeal against Canada's countervail duty on beef.

-- The European Economic Community's decision to reduce dairy production (will increase beef production).

If the Canadian countervail against beef from the European Economic Community is lifted in 1987, it can be expected to moderate slaughter cow prices in Canada. The expected decrease in EEC dairy production will result in increased beef supplies adding to the quite large stocks of beef the Community currently maintains. It can be expected that political pressure from the EEC will increase with the expectation that the Canadian government will modify its current position.

-- Canada- United States free trade talks
-- National Cattleman's Association study of Canadian support programs for the cattle industry

There appears to be little doubt that even the federal government's tri-partite stabilization program will be labelled as a subsidy and countervail action will be requested by the National Cattleman's Association in 1987. The only questions that remain unanswered is how high a countervail will be asked for and whether it will be on live cattle and on beef movements. If the United States-Canada free trade talks are successful, this may tend to moderate or offset the efforts of the National Cattleman's Association.

-- The Alberta government's feed grain transportation rebate program.

The rebate to Alberta feed grain producers that sell into their domestic market of approximately twenty-

one dollars per tonne, allows Alberta cattlemen to pay over eight dollars per hundred-weight more for calves than Manitoba cattle feeders. This in turn reduces the amount of cattle being fed in Manitoba from an already low level and creates supply and cost problems for all Manitoba packing plants. This program is a perfect example of the inability of provincial and federal governments to resolve policy issues. As a result, the Alberta government is providing a subsidy to offset the effects of a federal subsidy.

-- The potential for Canadian cattle prices to fall to an export price base in 1987

For a large part of 1986, Manitoba cattle prices have been near or at the import price level. With relatively more cattle on feed across Canada and the United States, and with one packing plant in Manitoba closing its' slaughter facilities, there appears to be considerable potential to approach the export price basis. As the difference between the import and the export price basis is approximately $16/cwt., on a live wieght base, there would be a considerable negative price impact on fat cattle, feeder cattle, and calves.

-- An increasing Canadian dollar value

Although the probability of a rapid increase in the

value of the Canadian dollar is extremely low, it is nevertheless important to recognize the impact it could have on the cattle industry. Each one cent increase in the value of the dollar can cause over a one per-cent decline in Canadian cattle prices. This in turn decreases cattle inventory values. For those farmers that are carrying a relatively heavy operating or long-term financial debt load, net worth, or equity will decline. Aggravating this, is that outstanding loans will not be adjusted to currency value changes.

These last two factors are probably the most significant of all. If in fact, something did happen to increase the value of the Canadian dollar to equal the American dollar, potentially every farmer with debt could be on the verge of financial insolvency. With this in mind, it is indeed fortunate that the Canadian and provincial governments are unable to get their deficits under control.

As 1987 unfolds there will be at least as many surprises as there was in 1986. One can be most certain that agriculture, in 1987, will continue to face many uncertainties.

In summary, an effort has been made to draw attention to one perception of the factors that have an significant impact on the future viability of the

cattle industry. It has been assumed throughout this paper that production and farm management practices in the industry are adequate, consequently the major focus has been marketing and policy. To that end, it has been asserted that government agriculture policies tend to adress the symptoms of agricultural problems, not the cause, thus tending to aggrevate rather than alleviate the problems.

Consumer understanding and understanding the consumer appears to significant in its' absence from industry concerns. More research, development, and promotion in the areas of new products, packaging, and marketing are required in order to improve cattle prices and maintain price stability.

Generally, the cattle producers view of the marketplace appears to be subjective. This lack of objectivity (although understandable) rather than the lack of information is a primary reason for the lack of flexibility of production plans in dealing with changing economic conditions within the marketplace. The first step in altering this perceived problem would be to recognize that cattle producers do not market fat steers and heifers, cows, feeders, and calves. They market different forms of beef.

It must be recognized that the cattle industry is interdependent with conditions that exist not only in other agricultural sectors, but all other sectors of the economy. As well, consumers are more dependent on the well-being of agriculture for their own well-being than they are prepared to recognize.

Recognition of these factors is a first step toward developing and implementing a strategy to correct the lack of understanding. The alternative is to relinquish the responsibility of market planning to governments and regulations. The choice is yours.

Al Hingston
Beef Program Manager
Saskatchewan Agriculture

The only way to handle an assigned title like "Shape Up or Ship Out" politely is to talk about cow-herd management. Now words like **Management, Efficiency** and **Records** inspire yawns or gritting of teeth because they usually imply somebody might have to **change** the way they now do things. And none of us like change because we are comfortable with what we know.

Well, **Management** is simply getting the job done. Its **meeting** your objectives with actions taken, using available resources. **Efficiency** is the input: output ratio, but that doesn't go far enough. Its the input:output ratio at a given point in time compared with the competition. Its a treadmill that won't let you slow down or stop, because if you do - you're out of the game.

Change is normal in a dynamic system. Your resources are constantly changing in cost and availability. Your competition which includes your neighbours in the cow business, the USA, the EC, the Australians and the pork and poultry industry, are constantly changing, getting more efficient. In commodity production, whether it is beef, pork, milk, eggs, lumber, steel or electricity, whoever can produce it cheapest makes the most profit. **Change,** from your position as a manager, is the new skills, new technology, new equipment, new actions that you require to continue to meet your **primary** objective, which is usually income or life style.

One of the things you need now, more than ever before, is **information.** That's the bottom line; what records are really all about. They are a source of information about your herd and about the individual animals in it. **Records** are work, no question. But think of them as a sweat-equity odds-improver. So your management decisions and subsequent actions have a better chance of achieving your goals. Collecting accurate data is only part of records. The pay-off is in **using** the information.

Maybe that's where we've let you down in the past, those of us who sell new ideas, new skills, new technology. We've spent too much

time talking about **how** to keep records and not enough time showing you the information in those numbers. There is nothing friendly about a page with 400 to 600 numbers on it. A crowd of people is overwhelming too, until you get to know the individuals that make up the crowd.

Ed Duren, Idaho Beef Specialist, talks about four key indicators:

1. Open Cows
2. Length of Calving Season
3. Death Losses
4. Growth Rates

These are easy numbers to get, easy to understand and easy to convert to dollars. They tell you where you come from, where you are and what direction you are going with your herd. But when you start to look for those key causes that Ed talks about - that's when you need more information, more detailed records. Those key causes:

1. Nutrition
2. Disease
3. Reproductive Soundness
4. Management

all show up in your records when you know how to look for them. So this paper will spend a little time on **what** numbers to write down and more time on examples of **how** to find the information the numbers tell you.

The form your records are in is not important as long as you can carefully and consistently gather the data and as long as the information is easily available to you. Whether you are on mainframe or micro, pocket record book or Hilroy scribbler, the essentials don't vary much.

Start by identifying the animals, permanently. Ear tags work well, with occasional losses. Tattoos, properly done, in combination with tags is best. If you just tattoo replacement heifers, in a few years the bulk of the herd is done. Everyone has their own system for numbering their cattle. Canada is fortunate because we have a nationally recognized tattoo system - that works on ear tags whether you tattoo or not. The purebred people already use it.

Table 1: **The Canadian Tattoo Format**

1. Breed Code - HH
2. Herd Letters - WJG
3. Animal Number - 37
4. Year Letter - P

This animal is a horned Hereford that was born on Jack Gamble's ranch. It was the 37th calf born in the year 1982. No other beef animal in Canada has that number, it is unique. Now unique is only important to a mainframe program like ROP which crunches numbers from several breeds, hundreds of herds and thousands of cattle. On your operation, number and year are important, and are usually written on your ear tag.

Some people like to number the calf the same as the cow because it makes pairing up, sorting, etc. much easier. The system breaks down when 37P has a heifer in 1985, which is 37T. You keep her as a replacement and she calves this spring. Now you have two 37 dams so you call one calf 37PW and the other 37TW. In another five years you could have four or five 37 dams and you need 6 inch wide ear tags.

The simplest is to number consecutively in the order of birth. (Some people even number the calves that are born dead or die shortly thereafter). There are advantages to consecutive numbering too. You know at a glance how many calves are born to date. You know if 37P had calf number 5 last year and number 25 this year that she is slipping through the herd. Find out why so she doesn't slide out the bottom and come home empty in a year or two. When you are picking replacements you know instantly which heifers were born early in the calving season.

Some day electronic identification will give each animal a cheap, easily readable "social insurance number" but in the meantime, we have to do it the hard way.

Once the animals are identified, there are some items that are essential to any good set of records. Calving date, cow ID, calf ID, sire ID, (individual or battery) and calf sex are all basic data. After that, record things like calving ease, calf condition (strong, weak) cow complications (retained placenta, bad mother etc). If you graft an orphan calf onto another cow, record it. If one group of cows spend the summer on native range, while a second is on seeded pasture with ample grass, record it. Keep track of herd management events and dates - when the bulls were turned out, when you changed pastures, when you vaccinated, castrated, dehorned, branded. Record death losses and sales too. The first rule of records is "Write It Down!".

Now that you have all this data - the question is what information can you get out of it? We all know people with Hilroy scribblers full of numbers going back to their first cow, that gather dust. The keeper of those records got some benefit from them because he or she did LOOK at the herd when they wrote the stuff down. Now this is where computers come in handy because they don't forget and they can do calculations and summarize things faster than that old four-function desk calculator.

A. **Calving Distribution** is the easiest, most important and potentially most profitable part of your records. How many calves are born each week during calving season and how many weeks did it take for three quarters of your calves to be born? If you are calving out in 30 to 40 days, you are in the elite. 40 to 60 days? Average. How about 60 to 100 days? You've got money to make! The earlier the calf is born in your calving season the older it is at weaning. At two pounds per day gain every day is worth $2.00 at today's prices. Or every heat cycle the cow doesn't conceive costs you 40 bucks. Look at the following example of two herds with identical genetics but different calving distributions.

Table 2: **Effect of Calving Distribution on Gross Returns**

	Herd I	Herd II
Calves by 3 Week Periods:		
1.	75	20
2.	25	45
3.		30
4.		5
ADG birth to weaning	2.25	2.25
Average actual weaning wt.	580	537

Difference: 4300 lbs, the equivalent of 8 more calves in Herd II, worth $4500 at 1986 prices.

Now herd owner II is in a position to make some changes and some money. He even knows about how much he can afford to spend ($1500 - $2000) to achieve his goal. He has some clues about what the problems might be and what he should do. "Use fertile bulls, pull them three weeks sooner, cull the open cows, replace them with heifers born early in the calving season that were bred over a maximum of four to six weeks. The "hump" of 45 calves, then 30 in the middle of calving suggests cows that were down in condition and took an extra three or four weeks to cycle. A few pounds of grain for three weeks before and the first three weeks of breeding does wonders in flushing the cows."

A tight breeding season makes a tight calving season, makes for extra pounds of calf, extra dollars. Not only did your records tell you where there was a weakness, point out possible problems, but they told you over the next year or two that the changes you made worked!

B. **Disposals** - deaths and sales: Where do your calves, and cows go, and why. The ROP Beef program has a new 3 digit disposal code system that allows you to record as little or as much detail as you want, regardless of your record system.

Table 3: **ROP Beef Disposal Code Examples**

1. Died from disease or injury.
1.3 Died within 24 hrs. of birth.
1.3.8 Died within 24 hrs. of birth from cold stress.
2. Sold.
2.1 Sold for slaughter.
2.1.7 Sold for slaughter because breeding problems.

At the end of the year and over the years you build up a picture of where every animal went that left your herd and why. Are you selling more open cows than poor producers? Are feet and legs taking your bulls? Are you losing calves to scours, pneumonia, cold stress, white muscle? Look for patterns, trends. Put dollar values on your losses, then you know how much you can afford to spend, in dollars or effort to correct the problem, and further your records will tell you when it is corrected.

C. **Cow Productivity By Age** How many cows, by age, how are they performing?

Table 4: **Cow Productivity By Age**

	Cow Age (Years)				
	2	3	4	5-10	10+
Cows Calving	19	9	13	28	1
Calves Weaned	15	9	12	28	1
Actual Weight	456	518	515	539	620
Adjusted Weight	483	549	582	547	601

Here's an example of a herd of 65 cows in fall 1986. Almost two-thirds are under 5 years of age. The owner culled heavily from about 80-85 cows because of the dry years in 83-85. Notice the death losses in the 2 year olds. Look at actual and adjusted weaning weights. (**Adjusted** simply removes some of the **environmental** differences such as age of dam and birth date of calf so you can look at the **genetic** value of the cow). This owner will cull his 2 and 3 year olds based on performance. His four year olds are his best cows, genetically. But their actual weaning weight wasn't all that high because some calved late. He uses the 4 year olds in his AI program and strung out calving. He also lost a calf. Key cause: management, perhaps. His 5-10 year old cows have hit their stride and one old girl over 10 is still in the herd for obvious reasons.

D. **Culling and Selection** are where several years records pay off. Maybe not so much for culling because when you've culled the opens, the swing bags, cancer eyes, foot rots, bad

dispositions and old agers, you may not be able to cull too many more. Take the worst five calves, turn'em out and ship whatever they mother up to. Its when the loser categories are under control that you need records to cull.

Replacements are the big pay off - select heifers based on their dam's performance, (assuming you are using a maternal sire). The numbers are only guides, they do not dictate, as can be shown in this example, again from the same herd as table 4.

Table 5: **Lifetime Production Summary**

	Cow #		Herd Av.
	45M	35P	
Previous Calving Date :	86/03/04	86/02/27	
Last Calving Interval :	361	363	384
Progeny Born :	5	3	3.0
Progeny Weaned :	5	3	2.9
Age at Last Calving :	5-11	3-11	4-5
Av. lbs. Weaned-Act. :	539	529	490
Adj. :	562	529	537
Av. ADG Birth to Wean :	2.34	2.20	2.24
Av. Weaning Index :	105	96	101
Dam :	28K	24K	

At first glance 45M would be the logical cow to keep a replacement heifer from. Her five calves had an average weaning index of 105, compared to 35P with 96. But ask some more questions. Were they both bred to similar bulls or did 45M have several calves sired by a bull with high gain to weaning? Why is 45M's actual weaning weights lower than the adjusted by 24 lbs - was she late one year with her calf? Was it the AI program or something else. Does she have any undesirable physical problems - feet, legs, udder, disposition? You still have to answer these questions, from other sources in your records.

This herd has only been on this record program for 5 years so data is missing on older cows. Also notice the dam numbers. This is an 80 cow herd but 75% of the cows have numbers under 40 and so do 75% of the dams. Heifers born early, breed early, stay in the herd and produce replacements. Look at the **Herd Average Weaning Index** of 101. In any single year it is 100, of course but if you keep cows with high indexes the lifetime herd average weaning index should be over 100 - probably 102-103 with **complete** records.

E. **Sire Selection** is where other people's records are important. Use them! What you see isn't necessarily what you will raise. The eyeball worked well when it was all we had.

So did the abacus. So did the Red River cart. The show ring is a marketing tool not a selection tool for genetic improvement.

A study of 1500 cattle shown at Denver from 1978 to 1984 (JAS63:1101), showed that height and weight were most highly correlated to show ring placing (.63,.43 respectively). Height of ancestors was even more highly correlated (.78). The correlation between show ring placing and sire estimated progeny difference (EPD) were weaning weight 0.16; yearling weight 0.10; maternal breeding value 0.07. Not exactly confidence inspiring.

Buy structurally sound, fertile bulls that have the genetics to do what you want them to do. If you are feeding out the calves - look for yearling index and gain on test. If you are looking for maternal, don't worry that he wasn't the fastest gaining bull - its fertile milking daughters you are after. Look at the weaning indexes of the dam and sire, not just the individual.

It is no wonder Canadians buy American bulls. Americans put their herds on performance record programs. And the new EPD calculations mean you only have to look at a few numbers because all available data from all available relationships are taken into account. We have lots of good bulls in Canada but we don't know where they are.

The information that is discussed in this paper is what is currently available from the ROP Beef program. Its not the best program in the world but it works. The addition of EPD's this fall (or whenever) will certainly make it better for the purebreeder. But 99% of the information the commercial man needs is there now. The program demands two things of you; that you identify your animals by the Canadian Tattoo System - at least on paper and that you weight the calves at weaning. The information you get back pays off if you use it. You can truly tell old bossy "102P" to shape up or ship out.

THE COW COMMITTEE

Once upon a time
At the start of all creation
Angels sat upon a cloud.
An odd conglomeration
Of buckaroos from near and far
But not there from the city.
Their job; to build a brand new beast.
They were the Cow Committee.

"Now me, I'd like some floppy ears,"
Suggested Texas Jake.
"Floppy ears would freeze plum off
On the Powder or the Snake!"
"Up north we need some curly hair,"
Said Colorado Bill,
"Hide that's tight and hair that's thick
To ward against the chill."

"Hold yer horses, one and all,"
Said Omaha Eugene,
"Nebraska needs a fleshy cow;
A real corn machine!"
"She'd waste away!" cried Tucson Bob,
"What we need's a hump.
One who'll live on tumbleweeds
And run from clump to clump."

"How 'bout horns?" said Oakdale Pete.
"Don't need'em in Des Moines."
"We'll make some with and some without
And some with tenderloins."
"Some with sheaths that drag the grass
And some so dadgum tall
To hear her calf down on the ground
She'd have to place a call!"

"I'd like'm roan," said Shorthorn Mike.
"No, black," said Angus Tink.
"White or red," said Hereford Hank,
"I'd even take'm pink!"
"Whatever suits you tickles me,"
Said Juan from Mexico.
"I second that," said Crossbred Jack,
"Just make'm so they grow."

They made some white. They made some blue.
They made some orange and spotted.
They never made a green one
But they made'm tall and squatted.
In every shape and every size
But no one had decided
How to make the perfect cow;
On that they were divided.

This went on for days and days,
In fact, it never ended.
Each time they reached some middle ground
The project was amended.
They still meet from time to time
And argue with their leaders.
The Cow Committee carries on. . .
They're now the purebred breeders.

Coyote Cowboy Company
Baxter Black, Head Cowboy
775 South 8th Avenue
Brighton, Colorado 80601